

First Five-Year Review Report

for

**Reilly Tar and Chemical Corp. (Dover Plant),
Dover, Ohio**

June, 2005

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Five-Year Review Report

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
Agency	United States Environmental Protection Agency
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
CPC	Contaminant(s) of Potential Concern
DNR	Department of Natural Resources
FS	Feasibility Study
IC	Institutional Controls
NPL	National Priorities List
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
PPB	Parts per billion
PPM	Parts per million
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RD	Remedial Design
RAOs	Remedial Action Objectives
RI	Remedial Investigation
ROD	Record of Decision
US EPA	United State Environmental Protection Agency

Executive Summary

The remedy for the Reilly Tar and Chemical Corporation (Dover Plant) site, located in Dover, Ohio, included the following components:

- Excavation and off-site thermal treatment of sediments, on-site soils and impacted perched zone materials with greater than 100 ppm of benzo(a)pyrene toxic equivalents (B(a)P-TE);
- Off-site disposal of solidified tarry wastes;
- Excavation and on-site disposal of sediments, on-site soils and impacted perched zone materials with greater than 5 ppm and less than 100 ppm of benzo(a) pyrene-TE;
- An Ohio RCRA subtitle D solid waste cap over the on-site disposed materials;
- A soil cover over the remainder of the site;
- Natural attenuation with long-term monitoring of shallow groundwater; and
- Institutional controls.

The site achieved construction completion with the signing of the Preliminary Close-Out Report on September 9, 2000. The trigger action for this five year review was the first day of field work on the remedial action, which was June 12, 2000.

In the short term, US EPA believes the remedy is protective because there are currently no direct exposures to contaminants at the site. However, a long-term protectiveness determination of the remedy at the site cannot be made at this time until further information is obtained. Specifically, further groundwater and subsurface product investigation is necessary to determine if the remedial action objectives are being met. Additionally, the ecological risk assessment of the Tuscarawas River needs to be completed.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Reilly Tar and Chemical Site		
EPA ID (from WasteLAN): OHD980610042		
Region: 05	State: Ohio	City/County: Dover, Tuscarawas County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs?* <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: 09 /29 /00	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Brenda R. Jones		
Author title: Remedial Project Manager	Author affiliation: US EPA Region 5	
Review period: 08/26/04 to 06/12/05		
Date(s) of site inspection: April 21, 2005		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input checked="" type="checkbox"/> 1 (first)		
Triggering action: <input checked="" type="checkbox"/> Actual RA Onsite Construction		
Triggering action date (from WasteLAN): 06 /12 /2000		
Due date (five years after triggering action date): 06 / 12 / 2005		

Five-Year Review Summary Form, cont'd.

Issues:

1. Additional information on perched aquifer head, chemical analysis, flow rates, capture zone and impact on shallow aquifer is necessary.
2. Additional information on the contaminant concentrations above MCLs in the groundwater is necessary.
3. Additional information on stability of coal tar product on and off-site is necessary
4. Need to complete the ecological risk assessment of the potential impacts of the site on the aquatic systems of the Tuscarawas River
5. Question on whether the Reilly wells, located next to the Dover wastewater treatment plant are properly abandoned
6. There are no statistical assessment or corrective action measures stipulated in the remedial action work plan concerning the groundwater monitoring program.
7. Recent Quarterly Ground Water Monitoring reports have not included all of the information that was required per Reilly's O&M plan.

Recommendations and Follow-up Actions:

1. US EPA will work with OEPA and Reilly Industries to perform further groundwater investigation including an evaluation of contaminant concentrations above MCLs.
2. US EPA will work with OEPA and Reilly Industries to perform further subsurface product investigation.
3. Reilly Industries will finish the screening level and baseline ecological risk assessments on the aquatic systems of the Tuscarawas River.
4. OEPA will follow up internally to determine if wells were properly abandoned.
5. US EPA will determine if statistical analysis and corrective actions measures can be developed and implemented at this time.
6. US EPA will ensure this information is included in future groundwater monitoring reports

Protectiveness Statement(s):

In the short term, US EPA believes the remedy is protective because currently, there are no direct exposures to contaminants at the site. However, a long-term protectiveness determination of the remedy at the site cannot be made at this time until further information is obtained. Specifically, further groundwater and subsurface product investigation is necessary to determine if the remedial action objectives are being met. Additionally, the ecological risk assessment of the Tuscarawas River needs to be completed.

Other Comments:

None

**Reilly Tar and Chemical Corp. (Dover Plant),
Dover, Ohio
Five-Year Review Report**

I. Introduction

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (US EPA) Region 5 has conducted a five-year review of the remedial actions implemented at the Reilly Tar and Chemical Corp. (Dover Plant) site in Dover, Ohio. This review was conducted from August 26, 2004 through June 12, 2005. This report documents the results of the review. The Ohio Environmental Protection Agency (OEPA) provided support in the development of this five-year review.

This is the first five-year review for the Reilly Tar and Chemical Corp. (Dover plant) site. The triggering action for this review is the date of the mobilization to perform the remedial action, as shown in US EPA's WasteLAN database: June 12, 2000. This five year review is being performed because the selected remedy for the site included leaving hazardous substances, pollutants or contaminants on site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Initial discovery of problem or contamination: Submittal of Notification of Hazardous Waste Form to US EPA	06/81
Site Investigation: installation of 5 monitoring wells	03/85
Site Investigation: on-site soil investigation	07/88
Consent Order to Reilly Industries and Ronald and Lois Quillin to fence the site	10/88
NPL listing	08/30/90
Expedited Response Action for removal of surficial coal tar and asphalt	06 - 07/90
Remedial Investigation/Feasibility Study complete	03/31/97
ROD signature	03/31/97
Remedial design/remedial action (RD/RA) Consent Decree (CD)	09/04/98
Remedial design start	03/13/98
Remedial design complete	09/28/99
Actual remedial action start	09/28/99
Construction dates (start)	06/12/00
Preliminary Site Closeout Report Signed	09/29/00
Final Close-out Report	not applicable
Deletion from NPL	not applicable
Previous five-year reviews	none, this is the first

III. Background

Site Description

The Reilly Tar and Chemical Company site is a 3.66 acre parcel of land situated in Dover, Ohio, on Third Street, southeast of the junction of State Route 211 and State Route 39, three-quarters of a mile north of the junction of Sugar Creek and the Tuscarawas River. Current land use adjacent to the study area is mainly commercial and residential north of the site toward the Dover downtown area, and industrial to the west and southwest. The site is bordered on the northeast by an abandoned canal turning basin, which functions today as a drainage ditch directing storm water runoff from the City of Dover into the Tuscarawas River. Public power and sewage facilities are immediately east of the site and an open and undeveloped industrial area south of the site is currently used for fill and borrow disposal. Figure 1, in Attachment 1 is a site location map.

The City of Dover, Ohio is a small midwestern town with a population of almost 14,000 people. The only environmentally sensitive area near the site is the Tuscarawas River. An ecological risk assessment is currently underway to further define the impacts of the site on the river.

Land and Resource Use

Currently, the remedial action at the site is in operation. The site is covered and vegetated to maintain easy access to the groundwater treatment system (see Attachment 2 for site photos). The Record of Decision (ROD) for the site (US EPA 1997) envisioned future site use would remain industrial. It is also anticipated that current and future land uses for the area surrounding the site will remain industrial.

The following habitat types were identified at the site and surrounding areas: river, riparian forest (riverbank and drainage ditch), meadow, disturbed area (site and off-site), wooded area, and industrial area. According to information provided by the U.S. Fish and Wildlife Service and the Ohio Department of Natural Resources (DNR), there are no records of any state-listed or federally-listed threatened or endangered species in the area. Although the Indiana bat (*Myotis sodalis*), a federally-listed endangered species, occurs in Ohio, Tuscarawas County is outside of its range. The Ohio DNR Natural Heritage Program has no records of threatened or endangered plant or animal species, nor of any nature preserves or unique ecological features in the vicinity of the study area.

Surface water bodies associated with the site include the storm water drainage ditch, Sugar Creek and the Tuscarawas River. The storm water drainage ditch receives water from the City of Dover storm water sewers in the downtown area, and discharges directly into the Tuscarawas River. As part of the remedial action at the site, the drainage ditch has been covered with an impermeable cover (cement) and is supposed to be monitored to ensure that sediments do not build up in it again. During dry periods, water generally does not flow in the storm water ditch, however, standing water has usually been observed in portions of the storm water ditch.

Sugar Creek is located approximately one-half mile south-southwest of the site. Sugar Creek is a shallow stream generally about 50 feet wide. Its origin is at the Mead City Dam approximately 9 miles north of the site. Sugar Creek flows southeast and discharges into the Tuscarawas River. The Tuscarawas River is located approximately 210 feet east of the site. The Tuscarawas River is approximately 150-feet wide and flows north to south. The Tuscarawas River is dammed at several locations to maintain constant pool

elevation. A fixed-head dam is located near the site and immediately south of the City of Dover waste-water treatment plant. (See figure 2, site features map in Attachment 1).

Ground water in the Dover area is utilized by rural, municipal and industrial consumers. The City of Dover passed Ordinance No. 34-96 which bans installing ground water wells for human consumption throughout the City.

Ground water at the site occurs in three separate aquifer systems: perched, regional and bedrock. The perched aquifer is located above a clay layer. The saturated thickness averages 3 feet, but varies from as little as 6-inches to as much as 6 feet. Well yields in the perched aquifer varied from non-productive to greater than 2 gallons per minute. The ground water flow in the perched aquifer is influenced by the elevation of the clay layer. Ground water will flow from points of high elevation to low elevation due to gravity. The perched water zone appears to be interconnected with the storm water drainage ditch. Typical horizontal hydraulic gradients in the perched aquifer ranged from 6.84×10^{-3} to 1.58×10^{-2} . This aquifer is not utilized for water production.

The regional aquifer is divided into three "zones" for the purposes of discussion below: shallow, mid-depth and deep. The zone designated as shallow is anywhere from 19-51 feet below the ground surface; the mid-depth zone extends from 52-180 feet, and the deep zone extends from 180-290 feet. The regional aquifer consists of coarse, permeable, glaciofluvial sand and gravel sediments. The regional aquifer occurs in the paleo-river channels and has a saturated thickness greater than 290 feet. In most areas, the regional aquifer is hydraulically connected to the Tuscarawas River. The regional aquifer is widely used for municipal water supplies for Dover and New Philadelphia and for numerous industrial production wells. Potentiometric ground water levels in the regional aquifer indicate that flow is in an east-southeast direction toward the Tuscarawas River. Closer to the river, the ground water flows in an easterly direction. Typical horizontal hydraulic gradients in the deep and shallow regional aquifer ranged from 1.11×10^{-3} to 2.6×10^{-4} and 1.11×10^{-3} to 1.54×10^{-3} , respectively.

Vertical hydraulic flow gradients indicate that there is a downward component of ground water flow in selected monitoring well clusters. This suggests that the shallow portion of the aquifer is hydraulically interconnected to the Tuscarawas River (i.e., shallow ground water may discharge to the river), while the mid-depth and deep portions of the aquifer may not be influenced by the Tuscarawas River.

The bedrock aquifer (top of bedrock 185 - 215 feet below ground surface) consists of sandstone, shale, and limestone sequences of the lower Pennsylvanian system and/or sandstone and shale sequences of the Upper Mississippian system. Primary ground water flow in the bedrock occurs within the pore space of the consolidated rock. Secondary ground water flow in the bedrock generally occurs along bedding planes, joints and fractures.

History of Contamination

The former Reilly Tar plant in Dover, Ohio and adjacent areas have an extensive industrial history that began in the mid-1800s. The development of the site includes part of the Ohio Canal, which paralleled the Tuscarawas River, the local pig iron blast furnace industry, a coking plant and foundry, and a coal tar refinery. The site was established by the F.J. Lewis Manufacturing Co., on a parcel of land positioned between the Hanna Furnace Co., a blast furnace facility and the coke oven facility of the Dover By-Products Coke Company. The tar refinery was built on top of 10 to 20 feet of slag disposed there earlier

by the blast furnace operations. A large area south of the refinery was also covered with slag, which was mined out during the 1940s and 1950s. This mined area and the former Ohio Canal running along the east border of this area, were then used as a city dump from at least 1957 to 1969. There is some indication from aerial photographs that portions of the Ohio Canal were filled with municipal waste and trash prior to this period. Neither the mined area nor former Ohio Canal are part of the Superfund site.

Coal tar refining operations were conducted on the site from approximately 1921 through 1956. During that time, coal tar wastes accumulated on the ground from spillage and other site activities. Reilly Industries, Inc., owned and operated the site as a coal tar refinery from at least 1932 to 1956. The site has been vacant and inactive since 1956, when Reilly Tar & Chemical Corporation sold the property. The property has been passed through several owners since 1956 and is presently owned by Ronald and Lois Quillin.

Reilly submitted a Notification of Hazardous Waste Site form to the US EPA in June 1981. The form identified the general and specific types of waste at the site to be "organic" and "creosote", respectively. During March of 1985, five ground water monitoring wells were installed on the site by Herron Consultants, Inc., with personnel from Ecology & Environment, Inc., and Region V Field Investigation Team (FIT) supervising the drilling, soil sampling, and well installation. The investigation was performed to generate ground water data for the Hazard Ranking System model.

Ground water was found to flow east southeast across the site. Tar was detected in one well. Ground water sampling was conducted to determine if contaminants were leaking into the ground water. Three of the wells were found to contain polycyclic aromatic hydrocarbons (PAH). Volatile organics, primarily chloroform, 1,1,1-trichloroethane, and carbon tetrachloride were detected in the off-site and upgradient well. The report summarizing this investigation was dated February 11, 1986, and titled *Hydrogeologic Report on the Reilly Tar and Chemical Company Site, Dover, Ohio* (Ecology and Environment, Inc., 1986).

In July 1988, seven soil samples were collected and analyzed for PAH by the US EPA. Results of the analyses indicated the presence of PAH compounds common to coal tar. The background soil sample detected only trace amounts of a few PAH compounds. A Hazard Ranking Score was prepared by US EPA for the site based on information and assumptions concerning the risk to the local population, the potential migration of hazardous substances in the ground water, the potential contamination of drinking water supplies, and the potential for direct contact. The site was scored at 31.38, was subsequently proposed for addition to the National Priorities List (NPL) on July 24, 1988 and finally listed on the NPL on August 30, 1990.

In early October 1988, under a Consent Order executed by US EPA, Reilly Industries and Ronald and Lois Quillin erected a fence around the site. Pursuant to a Unilateral Administrative Order (UAO) issued by US EPA to Reilly Industries and Ronald and Lois Quillin on March 29, 1989, a Remedial Investigation (RI) was undertaken. The results of this investigation are discussed in detail below. The Remedial Investigation Report for the Reilly Tar and Chemical Corporation, Dover, Ohio dated June 1993 may be found in the site repository, at the Dover Public Library, and in the Administrative Record.

Initial Response

An Expedited Response Action (ERA) for removal of surficial coal tar and asphalt materials at the site

was performed by Reilly Industries during June and July 1990. All work was performed under US EPA oversight, in accordance with the Health and Safety Plan prepared for the ERA. US EPA oversight was provided by the Region V, Emergency Response Section On-Site Coordinator (OSC) and the US EPA Technical Assistance Team (TAT) contractor, Roy F. Weston, Inc. A total of 90 truck loads of surficial coal tar materials were hauled off site in 40 days. The total quantity of material removed was 1,442 tons.

Three types of surficial coal tar materials were encountered during the ERA. These materials included residual asphaltic coal tar material, highly viscous coal tar, and broken slag saturated with coal tar. The residual asphalt was found in many areas of the site. Coal tar was found around the perimeter of the main foundation, within and surrounding two smaller foundations or sumps; within the former canal turning basin; and in a limited section in the eastern part of the site. The slag mixed or saturated with coal tar was confined to two locations (the smaller foundations/sumps).

When the ERA was performed and at the present time, the coal tar material is not a listed hazardous waste under state or federal hazardous waste regulations (OAC 3745-51 and 40 CFR Part 261). Representative composite samples of coal tar, asphaltic materials, and slag were tested and found to be non-hazardous by the EP toxicity test. Thus, the coal tar materials were not a RCRA characteristic hazardous waste. However, because the coal tar materials contained hazardous substances (primarily PAH), Reilly Industries disposed of the non-hazardous wastes in a RCRA Subtitle C landfill (Envirosafe Services of Ohio, Oregon, Ohio).

Basis for Taking Action

In 1991 and 1992, Reilly Industries, Inc, performed a site-wide Remedial Investigation/Feasibility Study (RI/FS). The RI (ENSR 1993) was completed in June, 1993 and the FS (ENSR 1996) was completed in August, 1996.

Sampling and analysis was conducted in two phases for the RI. Subsurface soil, surface soil, surface water and ground water samples were analyzed for target compound list (TCL - a common list of organic compounds) constituents and subsurface soil and ground water samples were also analyzed for target analyte list (TAL -a common list of metal compounds) constituents during Phase I. Analytical data from Round 1 ground water samples and Phase I soil and sediment samples were used to determine the contaminants of concern (COC) that would be investigated during the Phase II program. COCs are as follows:

VOLATILES	METALS	SEMIVOLATILES
benzene	arsenic	phenol
toluene	barium	
ethylbenzene	chromium	PAH compounds (carcinogenic and noncarcinogenic)
xylenes	lead	2-methylphenol
styrene		4-methylphenol

Additionally, Toxicity Characteristic Leaching Procedure (TCLP) analyses were performed on tar and asphalt samples and TAL metals analyses were performed on slag samples.

Seven different media were sampled and analyzed. The media include:

- surface soils,

- subsurface soils,
- surface water,
- sediments,
- slag,
- groundwater, and
- tar and asphalt.

The RI included a baseline human health risk assessment which demonstrated human health risk to a potential future on-site resident or an on-site worker from exposure to carcinogenic polycyclic aromatic hydrocarbons (PAHs) in soils and methylphenols in groundwater.

The RI also included an ecological risk assessment. The potential ecological exposure pathways included the ingestion of and/or direct contact with contaminants of potential concern (CPCs) in the surface water and sediments of the Tuscarawas River and the drainage ditch, and the ingestion of and/or direct contact with CPCs in soils both on and off the site. The food chain exposure pathway, i.e., the ingestion of organisms and plants containing site-related chemicals, was also assessed.

The results of the terrestrial screening assessment showed the potential for adverse effects on terrestrial species in the area of the site is likely to be minimal. The results of the aquatic screening assessment were inconclusive. While acute and chronic toxicity effects are not likely to occur to aquatic species residing in the Tuscarawas River, surface water concentrations of CPCs may exceed chronic toxicity levels in the drainage ditch. Moreover, the results of the sediment screening assessment indicate that chronic toxicity effects are likely to occur to benthic species in the Tuscarawas River sediments in the vicinity of the drainage ditch outfall. Sediment concentrations of CPCs may exceed toxicity levels in the drainage ditch.

The FS Report (ENSR 1996) evaluated several remedial action alternatives for each of the site components (e.g. the drainage ditch sediments, surface soils, tarry materials, perched zone and shallow groundwater). The report also outlined remedial action objectives. In 1997, US EPA issued a ROD for the entire site.

IV. Remedial Actions

Remedy Selection

The response action selected in the 1997 site wide ROD involved institutional controls, excavation and off-site thermal treatment of sediments, on-site soils and impacted perched zone materials with greater than 100 ppm of benzo(a) pyrene toxic equivalents (B(a)P-TE), off-site disposal of solidified tarry wastes, excavation and on-site disposal of sediments, on-site soils and impacted perched zone materials with greater than 5 ppm and less than 100 ppm of benzo(a) pyrene-TE, an Ohio RCRA subtitle D solid waste cap over the on-site disposed materials, a soil cover over the remainder of the site, hydraulic control and collection of perched groundwater and natural attenuation with long-term monitoring of shallow groundwater. The ROD also called for sampling and analysis of sediments from the River. Specific details of the 1997 ROD are presented below.

Excavation and Off-site Thermal Treatment of Surface Water Drainage Ditch Sediments, Surface Soils and Impacted Perched Zone Material with B(a)P-TE greater than 100 ppm

The 1997 site ROD states that surficial soils with B(a)P-TE greater than 100 ppm (approximately 2,730 cubic yards) along with impacted drainage ditch sediment (approximately 120 cubic yards) will be excavated and treated in an off-site cement kiln. Impacted perched zone material from the collection trench excavation will also be treated in an off-site cement kiln. The trench will be backfilled with high permeability fill and clean spoils from the excavation. The surface water ditch will be lined to eliminate the hydraulic connection between the surface water and perched zone.

Excavation and On-site Disposal of Surface Water Drainage Ditch Sediments, Surface Soils, Impacted Perched Zone Material with B(a)P-TE less than 100 ppm and greater than 5 ppm

The 1997 site ROD states that surficial soils with B(a)P-TE less than 100 ppm and greater than 5 ppm (approximately 5500 cubic yards) will be excavated and placed in the building foundation on site. The cracks in the floors and walls of the building foundation will be sealed to ensure the integrity of the structure. The site will be grubbed and graded. Soil, concrete and/or slag removed to facilitate grading activities will be placed in the building foundation. The building foundation will be capped with an Ohio Solid Waste Cap, pursuant to 40 CFR 261 (Subtitle D) and Ohio Administrative Code Section 3745-27-08, and the remainder of the site will be covered with soil and vegetated.

Off-site Disposal or Recycling of Tarry Materials

The 1997 site ROD states that tarry materials will be solidified with lime, cement and/or flyash and will be disposed off-site, or may be recycled as a feedstock. To the extent that these materials are RCRA Characteristic Hazardous Waste, off-site disposal must comply with Land Ban regulations pursuant to 40 CFR Section 268 Subpart D, and with US EPA's off-site Rule, 58 Fed Reg 49200 (September 22, 1993), for disposal in an approved RCRA Subtitle C landfill. Transportation and storage of these materials would need to comply with 40 CFR 262, and 263 as well. It is estimated that a 20% volume increase would occur due to the solidification process. The recycling option will depend largely on material handling issues and the ability to segregate coal tar from the soils and sediments. To the extent that these materials are RCRA Characteristic Hazardous Waste, recycling of these materials must comply with Ohio Administrative Code Section 3745-50-311 through 3745-50-315, which govern criteria by which recycling variances to classification as a waste are granted.

Hydraulic Control and Collection of Perched Ground Water

The 1997 site ROD states that a horizontal trench will be installed within the saturated portion of the perched zone, on top of the underlying clay to a depth of approximately 15 to 18 feet below the surface (approximately 863 feet MSL) to recover perched ground water. The trench will be located in the central portion of the site and will be approximately 400 linear feet. The trench will be constructed to maximize drainage of perched contaminants while maintaining the integrity of the perched clay zone. Top of clay topography will, for the most part, determine the natural collection point of the trench where perched water will be pumped to an oil/water separator and discharged to the sanitary sewer line that leads to the City of Dover POTW.

A permit will be obtained from the City of Dover to discharge the water recovered from the trench to the POTW. Discharge to the POTW must comply with the POTW pretreatment program, including POTW-specific pollutants, pursuant to 40 CFR 403.5: Discharge to Publicly Owned Treatment Works. The

permit will establish appropriate pre-treatment limits pursuant to 40 CFR 403. Any waste to be discharged to the POTW will, if necessary, be treated to satisfy the standards set forth in the permit, prior to discharge. The discharge from the collection trench is expected to be approximately 2,900 to 7,200 gallons per day.

Natural Attenuation and Long-Term Monitoring of Shallow Ground Water

At the time of the ROD, no CPC present in the regional aquifer downgradient of the site exceeded Safe Drinking Water MCLS. CPC degradation and migration will be monitored in the shallow regional ground water to assess the effectiveness of natural attenuation on an on-going basis. The 1997 ROD indicated that monitoring wells will be in both upgradient and downgradient locations around the site to achieve these goals.

Institutional Controls

Regional planning indicates that the area will continue to be zoned only for industrial use. The ROD indicated that deed restrictions will be placed on the affected property to prohibit site disturbance and groundwater use. The City of Dover passed Ordinance No. 34-96 which bans installing ground water wells for human consumption throughout the City.

The current owner of the site and property south and west agreed to place deed restrictions on these properties to prohibit ground water use and limit disturbance of the land. The site will continue to be secured with chain-link fencing and a locked gate until the existing exposure risks at the site have been addressed.

Sampling and Analysis of Tuscarawas River Sediments to Monitor Ecological Effects

The Rod required monitoring of river sediments in the outfall and immediately downstream for 3-5 years to ensure that there are no risks to the aquatic ecosystem.

Remedial action objectives (RAOs) for each environmental media were developed in the FS, subsequent to the RI and risk assessment. RAOs serve as the basis on which remedial response alternatives are designed. RAOs must account for each pathway in which a risk or a potential risk to human health or the environment exists. Cleanup levels in each media are also determined in the FS. Cleanup levels are derived from within the acceptable residual carcinogenic risk range of 10^{-6} - 10^{-4} , based in part on future land use and other criteria such as practicability. For this site, cleanup levels were derived based on a residual carcinogenic risk level of approximately 1.0×10^{-5} , in an industrial future use scenario. Non-carcinogenic risks in the industrial use scenario were beneath the threshold hazard quotient of 1.0, and therefore are not of concern.

The following RAOs were developed for the site:

- Prevent worker exposure to CPC in the surface soil, tarry materials and sediments which pose an excess cancer risk of approximately 10^{-5} or greater;
- Prevent worker exposure to CPC in the sub-surface soil which pose an excess cancer risk of approximately 10^{-5} or greater;
- Prevent exposure to CPC in the perched aquifer above MCLs;

- Prevent exposure to CPC in the regional aquifer above MCLs;
- Prevent migration of CPC in surface and subsurface soils, and tarry materials to the regional aquifer;
- Prevent migration of CPC in sediments that would result in exceedences in ambient water quality criteria in the Tuscarawas River;
- Prevent migration of CPC in the perched aquifer migrating to the drainage ditch or the regional aquifer;
- Prevent migration of CPC in the regional aquifer.

Remedy Implementation

Reilly Industries, Inc. performed the remedial design (RD) from March 13, 1998 to September 28, 1999. No difficulties were noted during the RD. Reilly Industries began the remedial action (RA) activities on September 28, 1999 and finished September 30, 2002. The triggering action for this review is the date of the mobilization to perform the remedial action, as shown in US EPA's WasteLAN database: June 12, 2000. The remedy is performing as designed.

Remedial construction activities initially consisted of clearing and grubbing the property, installation of the decontamination pad and excavation of contaminated soil and sediment. Material containing B(a)P-TE concentrations between 5 ppm and 100 ppm was placed in the building foundation and capped with a Ohio RCRA subtitle D solid waste cap including a geosynthetic clay layer, flexible membrane liner and a final 30 inch soil cover. Soil and sediment containing B(a)P-TE concentrations greater than 100 ppm were thermally treated and disposed of off-site.

Installation of the passive collection trench was completed on July 31, 2000, and the treatment facility was completed on September 27, 2000. No additional wells were installed for collection of the contaminated perched groundwater. The treatment facility consisted of an oil water separator and a granular activated carbon system to treat the perched groundwater prior to discharge to the POTW. The final grading, including backfilling all excavated areas and placement of an additional 1-foot thick layer of common borrow was completed on September 15, 2000.

Approximately 7,481 cubic yards of soil were placed in the building foundation while approximately 4,658 tons of soil and sediment were transported off-site for thermal treatment and disposal and 2,801 tons of soil were transported off-site for disposal. Approximately 2,001 tons of clay were placed over the building foundation and approximately 34,174 tons of soil were brought to the site for final grading.

System Operations/O&M

System operation and maintenance (O&M) is described in the *Operation and Maintenance Plan* (August Mack 2002). O & M tasks are performed by Reilly Industries, Inc. for the groundwater remediation system to ensure proper and efficient operation of the perched groundwater recovery system. This includes inspections of mechanical and electrical components, operation of the oil/water separator, effluent compliance sampling and normal maintenance tasks to keep the system running. Water levels are collected from all monitoring wells and sumps associated with the site. Additionally, Reilly Industries Inc. performs inspections of the integrity of the equipment building, site fencing, sump manholes, monitoring wells, and the site cover is inspected for stressed vegetation and erosion.

The *Groundwater Monitoring Program* (August Mack 2002) outlines the groundwater monitoring requirements. The program was designed to "confirm that soil and groundwater contamination is

contained on-site and not migrating to the regional shallow aquifer". Groundwater monitoring has been conducted on a quarterly basis since completion of the remedial field activities. The current program includes monitoring groundwater elevations in five wells in the perched zone and four wells in the shallow aquifer. Between the 2nd and 3rd quarters of 2003, Reilly Industries, Inc., added in monitoring head levels of the two on-site sumps as well. Additionally, water samples are collected from four shallow monitoring wells for chemical analysis. Samples from all of the wells are analyzed for benzene, toluene, ethylbenzene and xylenes, while water samples from two wells are analyzed for PAH compounds.

In 2000, Reilly Industries, Inc. had problems with tar (product) getting into and fouling the system. This necessitated the installation of a product recovery system. Two Blackhawk pumps were installed into the sumps to prevent infiltration of product into the groundwater recovery system. Since installation of the product recovery pumps, the system is monitored twice a month. This monitoring consists of turning off the groundwater pumps and turning on the product recovery pumps. The product pumps are run for the time it takes to go dry. At this point, the product pumps are turned off, and the groundwater pumps are turned back on again.

The 1997 ROD lists estimated O&M costs for 30 years to be \$1,431,200, which averages to be \$48,000 per year. Table 2 lists the actual annual costs for O&M and other expenses since the remedy became operational. August Mack Environmental Inc., (AME) is Reilly Industries, Inc. contractor performing the O&M.

Table 2: Annual System Operations/O&M Costs

YEAR	AME (O&M)	Electrical & MSD*	Exceptions	
2004	\$84,305	\$13,448		
2003	\$85,680	\$9,600	\$9,635	Replacement of two high pressure granular activated carbon vessels, new effluent pump, and two new groundwater recovery pumps.
2002	\$69,600	\$9,611		
2001	\$58,850	\$9,225		
2000	\$19,655	\$483	\$10,007	Procurement and installation of two (2) product recovery pumps (Blackhawk® Pumps)

Comments:

MSD = metropolitan sanitary district

Increase in O&M due in large part to the method by which tar is now being recovered from the system and delivered for recycling. Tar had originally been allowed to collect in 55-gallon drums. These could no longer be accepted for recycling. To date, tar is collected in 55 gallon drums from the Blackhawk pumps in the two on-site sumps. The recovered tar and water is transferred to, and recovered in bulk, by use of a 20 cubic yard vacuum box.

The increase in utility expenses in 2004 is due to a slight increase in MSD rates and an increase in the amount of water recovered.

V. Five-Year Review Process

Administrative Components

The Reilly Tar Chemical Corp. (Dover Plant) Site Five-Year Review was led by Brenda R. Jones of the U.S. EPA, Remedial Project Manager (RPM) for the site and Sue Pastor, Community Involvement Coordinator (CIC). Christine Osborne of the Ohio Environmental Protection Agency (OEPA), assisted in the review as the representative for the support agency.

The review, which began on August 26, 2004 consisted of the following components:

1. Community Involvement;
2. Document Review;
3. Data Review;
4. Site Inspection; and
5. Five-Year Review Report Development and Review.

Community Involvement

Activities to involve the community in the five-year review were initiated in late summer 2004 between the RPM and the CIC. A notice was sent to the *Times Reporter*, the local paper in Dover and New Philadelphia, Ohio. The notice was published on September 30, 2004 and invited the public to submit any comments to the US EPA. No comments have been received to date. The results of the review and report will be made available at the local information repository at the Dover Public Library, Dover, Ohio.

Document Review

This five-year review consisted of a review of relevant documents including operation and monitoring records and monitoring data. Attachment 3 lists the documents reviewed for this report.

Data Review

Attachment 4 is an evaluation of the current status of groundwater monitoring and whether the remedy is accomplishing the RAOs stated in the ROD (see Section IV of this report). This evaluation was performed by US EPA Region 5 Groundwater Evaluation and Optimization System (GEOS) team. The GEOS team was tasked to determine the adequacy of the current monitoring program to determine success of the remedy. For their analysis, GEOS reviewed all quarterly groundwater monitoring reports and other documents listed in Attachment 3.

In particular, GEOS was tasked to evaluate groundwater-related RAOs. The ROD discussion of the remedy selection specifies “hydraulic control and collection of perched groundwater”. The ROD does not define the spatial extent of the perched aquifer to be controlled and collected. The following are highlights of the evaluation:

1. Additional perched groundwater head data are needed to determine whether there is any discharge to, or along the alignment of, the ditch, as this is a remediation objective described in the ROD. The primary concern would be from discharge of groundwater to the ditch and secondarily from point source discharge. Note, however, that the ditch is lined with concrete so it is unlikely to be receiving groundwater discharges.
2. Additional head data are needed to determine whether the trench is hydraulically controlling the flow of perched groundwater as intended by the design. The capture zone of the trench currently cannot be determined.
3. Water quality samples from the perched zone are needed, along with the head data. As it has been roughly a decade since the last evaluation of the extent of the perched zone plume, a synoptic round of samples should be collected from existing wells. The existing data precedes implementation of the remedy and post-remedy data are needed.

Such water quality samples are not required to locate head monitoring wells to determine the extent of hydraulic capture. However, if additional water quality monitoring wells in the perched aquifer need to be located, then such samples could help with the selection of monitoring well locations. These data will provide an updated estimate of the perched plume configuration.

4. The two on-site shallow monitoring wells currently monitored are not sufficient to determine whether the perched contamination has impacted the sand-and-gravel, except at these 2 locations. Water quality sampling from additional locations from the shallow groundwater zone is needed at the site to detect contamination in the lower aquifer. If detected, then the additional sampling locations will be used to determine the extent and degree of contamination.

Data from monitoring Well 4S (MW4S) is showing increasing concentrations of contaminants of concern with time (benzene and benzo(a)pyrene both have exceeded MCLs at this location during recent sampling events). The Groundwater Monitoring Plan (August Mack 2001) stated that MW4S is immediately downgradient of the site and will detect any potential releases from the site to the shallow regional aquifer. Since contaminant concentrations are increasing, this may be indicative of groundwater releases to the shallow regional aquifer.

In the Operation and Maintenance Program (revised February 1, 2002) it is noted that Reilly installed two product recovery pumps into the manholes in the recovery trench. The pumps use positive displacement

to transfer tar recovered from the bottom of the sump wells into 55-gallon drums. The pumps were installed after the groundwater recovery system was fouled with coal tar and had to be replaced.

In conjunction with an evaluation of a different Superfund site located north and west of the Reilly Site, two new monitoring wells were installed south and east of the Reilly Site near the existing electrical substation. These wells were screened at 17 -27 feet below ground surface (BGS) and 46 - 61 ft BGS respectively. A tar-like substance was encountered when installing both of these wells (see photographs of Monitoring Well 42a and 42b in attachment 2). The source of this tarry substance is, at this time, unknown, but a black tarry substance was noted on top of and interbedded with the clay layer when the wells were installed (personal communication with John Jones on July 19, 2004).

The need to pump the coal tar indicates that the tar is moving, which is contrary to the implicit assumptions used in devising the remedy (i.e. the coal tar was stable and not moving). The petroleum-like substance in MW 42a & MW 42b could indicate that the coal tar is moving beyond the boundaries identified in ROD (Figure 3). Therefore, additional investigation is needed to determine the extent of the coal tar plume as well as the extent of the contaminated perched zone.

Based on data reviewed to date, it is not possible to determine:

- Capture zones of the perched aquifer.
- Chemical characterization of the perched zone.
- Flow rates and direction of the perched zone.
- If the contamination in the perched zone is impacting the shallow aquifer and to what extent (e.g. delineation of the contaminated groundwater plume)?
- If the coal tar is stable on site or is migrating off-site?
- If the discharges to the ditch have ceased.

A concern at the time of the ROD was the potential ecological impacts of the site on the aquatic system of the Tuscarawas River. The ecological risk assessment performed as part of the RI was inconclusive and the ROD recommends monitoring the river regarding the effects on contaminants in surface water and sediments. Reilly Industries Inc. prepared a screening level ecological risk assessment (SLERA) of the river. The SLERA utilized previously available data. The results of this SLERA indicate that sediment concentrations exceed screening ecotoxicological sediment benchmarks. This indicates a potential for impacts to the aquatic systems of the Tuscarawas River and downstream waterbodies and further evaluation is necessary.

To date, U.S. EPA is waiting for Reilly to submit a final workplan for continuation of the investigation. This will include collection of sediment samples for chemical analysis. The results of these additional sediment samples will be used in an updated SLERA. The results from the updated SLERA will determine if a baseline ecological risk assessment is warranted.

The status of institutional controls was evaluated by Reilly Industries, Inc. as requested by US EPA. Their evaluation is presented in Attachment 5. According to the City of Dover, Ohio codified ordinance 925.16(b) "The drilling and establishment of private water supply wells (as defined in Ohio R.C. 3701.344) shall be permitted for purposes other than human consumption (i.e. irrigation, manufactured cooling purposes, etc.) No physical connections between private water well lines and water lines supplied by the Municipal water supply system shall be permitted (Ord. 56-96, Passed 11-4-96)."

Correspondence with the City of Dover verified the following enforcement methods used to prevent violation of the ordinance:

- Anyone planning to drill a well must apply for a permit through the City Director's Office.
- Water meters and backflow devices must be installed and are inspected by meter service personnel to determine adherence to site ordinances.
- Irregularities in meter readings are reported for investigation by a certified meter inspector
- When water utilities notice a dramatic change in water usage, property inspections are conducted.
- All reports from local residents, regarding possible violations of the ordinance, are investigated.

In addition to the city ordinance against private drinking wells, the property owners filed a deed restriction that limits the use of the property to industrial use only. The county clerk verified the deed restriction as recorded in the Tuscarawas County Deed records volume 214, page 142. The deed restriction states that the site is the subject of a Consent Decree. According to the Consent Decree, there is a "Notice of Obligations to Successors-in-Title", which provides that the owners record certain notices in the County Recorder's Office. One such notice is a "Notice of Entry of Consent Decree", which asserts that each deed shall contain a notice that states that the property is subject to this Consent Decree. A copy of the deed restrictions is presented in Appendix 5.

An eight foot chain-link fence currently encloses the property. The top of the fence includes a three row barbwire barrier. The only access to the property is a pad-locked vehicle gate and AME possesses the only keys to the gate. AME performs twice monthly inspection of the site which consists of a site walkover and survey for structural damage of the fence, gate or barbwire. Since the installation of the fence, visual inspections have not identified any areas requiring repairs.

Additionally, OEPA has noted the following concerns with the O&M that has occurred to date.

1. There are no statistical assessment or corrective action measures stipulated in the remedial action work plan. The statistical assessment is necessary to determine if the remedy is functioning properly. The corrective actions need to be addressed in case of failure or some other problem with the remedy.
2. Many of the Reilly Quarterly Ground Water Monitoring reports have not included all of the information that was required per their own plan, including ground water contour maps, an evaluation of the data, discussion of data quality and comparative trend regression analysis of the results.
3. There is a question on whether the Reilly wells, located next to the Dover wastewater treatment plant are properly abandoned. OEPA is looking into whether the well abandonment logs had been filed. If the wells were not properly abandoned then Reilly will have to fix the situation.

Site Inspection

On April 21, U.S. EPA, OEPA and representatives from Reilly Industries performed an inspection of the site. A detailed trip report can be found in Attachment 6. Briefly, all parties walked the site, inspecting the conditions of the monitoring wells and sumps, the well house, the status of the vegetated cap and site security (fence, barbed wire and locked gate). All items seemed to be in good physical condition except for some minor repairs. The repairs included some areas of the cap that may need reseeding, the monitoring wells need to have their numbers carved into their casings and one well needed its lid rewelded.

VI. Technical Assessment

Question A: Is the remedy functioning as intended in the decision documents?

With respect to the groundwater portion of the remedy, a review of all the documents indicates that the on-site equipment is functioning as intended in the ROD. Groundwater is being pumped, treated and disposed of as indicated in remedial design documents. One change was implemented to pump free product in addition to groundwater. All treatment systems and groundwater monitoring systems should continue operating until cleanup standards are achieved.

It is not clear, however, whether groundwater-related remedial action objectives (five of the 8 RAOs are specific to groundwater) are being met. The current groundwater monitoring program is not sufficient to determine if cleanup levels are being achieved or if containment is effective. Specifically, the current groundwater monitoring plan does not allow for evaluation of:

- Capture zones of the perched aquifer.
- Chemical characterization of the perched zone.
- Flow rates and direction of the perched zone.
- If the contamination in the perched zone is impacting the shallow aquifer and to what extent (e.g. delineation of the contaminated groundwater plume).
- If the coal tar is stable on site or is migrating off-site.

Additional monitoring will be required to make this determination, which may include the installation of additional monitoring wells.

The surface soil remedy is performing as designed. Currently, no tar and product can be found at the surface. The landfill cap prevents exposure to these materials.

A review of the ROD was conducted to determine whether institutional controls are in place and functioning as intended. The ROD required institutional controls to completely restrict use of groundwater on-site and to restrict the property to industrial/commercial use. Attachment 5 lists the current status of the institutional controls. The City of Dover passed ordinance number 34-96 that bans installation of groundwater wells in the City. As indicated by the August Mack review (Attachment 5) this ordinance appears to be enforced to date. Deed restrictions have been executed and recorded, and physical barriers such as site fencing and signage are also in place.

Based on the information presented above, it appears as though the soil and IC components of the remedy are functioning as intended, however, questions remain regarding the potential achievement of the RAOs for groundwater.

Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedy selection still valid?

There may be changes to the physical conditions of the site that would affect the protectiveness of the remedy. There are implicit assumptions in the design documents that the product below the site is not mobile and remains above the perched aquifer confining layer. However, this assumption should be questioned based on three indicators. The first being the tar-like substance noted during the installation of monitoring wells south and east of the site. As previously stated, the source of this material is not

known and must be investigated further to determine if its source is on-site. The second indicator is the fact that Reilly Industries, Inc. has installed product pumps to protect the groundwater pump and treatment system. This was necessary since product made its way into and fouled the pump and treatment system. The third indicator is the increasing concentrations of COCs in groundwater sampled as part of the quarterly monitoring program. Specifically, MW4s has consistently shown concentrations of benzene and benzo(a)pyrene above maximum contaminant levels (MCLs). This not only violates one of the site-specific RAOs, it also indicates that product is not as immobile as originally thought. If the product is mobile, then current exposure assumptions (as defined in the ROD) may not be valid.

There have been no changes in expected land use on or near the site. Further, human health exposure routes or receptors have not changed and do not affect the protectiveness of the remedy in the short-term. However, as previously stated, it is still unclear whether aquatic receptors in the Tuscarawas River are exposed to site-related contaminants or not. This is still under investigation as Reilly Industries, Inc. proceeds with the ecological risk assessment process as required by the ROD.

There have been no changes in standards or to-be-considered (TBCs) since the remedy. There are no newly identified contaminants or unanticipated toxic byproducts based on current information. Toxicity information and current risk assessment methodologies have not changed significantly so as to affect the protectiveness determination.

Based on the unknown status of the mobility of the product under the site and in the perched aquifer, potential changes in physical condition of the site warrant the conclusion that the exposure assumptions used at the time of the remedy may not be valid. Further investigation is warranted and is underway.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Yes, additional information had come to light that calls into question the protectiveness of the remedy. This information includes:

- the new monitoring wells installed south and east of the site which indicate possible movement of product from the site.
- an evaluation of the current groundwater monitoring program by USEPA GEOS team indicates that there is not enough data to make conclusions regarding the protectiveness of the remedy with respect to groundwater RAOs.
- the results of the screening level ecological risk assessment indicate sediment concentrations exceed screening ecological toxicological sediment benchmarks.

Technical Assessment Summary

The lack of data concerning the current groundwater pump and treatment system precludes making any determinations on the long-term protectiveness of the remedy. Further, current status of the ecological risk assessment of the Tuscarawas River indicates the potential for impacts to the aquatic communities in the river. Additional work needs to be done to implement a groundwater monitoring program that will allow long-term protectiveness determinations to be made. Within one year a groundwater monitoring plan will be implemented that will allow this determination.

Progress will also be made on determining whether the site is impacting the Tuscarawas River. Reilly Industries, Inc. has submitted a revised work plan for the next phase of the screening ecological risk

assessment.

VII. Issues

Table 3: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Additional information on perched aquifer head, chemical analysis, flow rates, capture zone and impact on shallow aquifer is necessary	n	y
Additional information on the contaminant concentrations above MCLs in the groundwater is necessary	n	y
Additional information on stability of coal tar product on and off-site is necessary	n	y
Need to complete the ecological risk assessment of the potential impacts of the site on the aquatic systems of the Tuscarawas River	n	y
Need to determine whether the Reilly wells, located next to the Dover wastewater treatment plant are properly abandoned	n	y
There are no statistical assessment or corrective action measures stipulated in the remedial action work plan concerning the groundwater monitoring program	n	y
Recent Reilly Quarterly Ground Water Monitoring reports have not included all of the information that was required per their own plan, including ground water contour maps, an evaluation of the data, discussion of data quality and comparative trend regression analysis of the results.	n	y

VIII. Recommendations and Follow-up Actions

Table 4: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Over-sight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Additional information on perched aquifer head, chemical analysis, flow rates, capture zone and impact on shallow aquifer is necessary, including investigation of MCL exceedances	Further groundwater investigation needed	Reilly Industries, Inc.	US EPA	09/30/06	n	y
Additional information on stability of coal tar product on and off-site is necessary	Further subsurface investigation needed	Reilly Industries, Inc.	US EPA	09/30/06	n	y
Need to complete the ecological risk assessment of the potential impacts of the site on the aquatic systems of the Tuscarawas River	Finish screening level and baseline ecological risk assessments	Reilly Industries, Inc.	US EPA	09/30/06	n	y
Need to determine whether the Reilly wells, located next to the Dover wastewater treatment plant are properly abandoned	OEPA to follow up internally and determine status of wells	OEPA	US EPA	09/30/05	n	y
There are no statistical assessment or corrective action measures stipulated in the remedial action work plan	U.S. EPA to determine course of action to rectify this	U.S. EPA	US EPA	09/30/05	n	y

Issue	Recommendations and Follow-up Actions	Party Responsible	Over-sight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Recent Reilly Quarterly Ground Water Monitoring reports have not included all of the information that was required per their own plan, including ground water contour maps, an evaluation of the data, discussion of data quality and comparative trend regression analysis of the results.	Ensure this information is included in future groundwater monitoring reports	Reilly Industries, Inc.	US EPA	09/30/05	n	y

IX. Protectiveness Statement(s)

Long-Term Protectiveness deferred:

In the short term, U.S. EPA believes the remedy is protective because all measures have been implemented to stop direct exposures. However, a long-term protectiveness determination of the remedy at the site cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions described in Table 4 above. It is expected that these actions will take approximately two years to complete, at which time a protectiveness determination will be made.

X. Next Review

The next five year review for the Reilly Tar and Chemical Corp. (Dover Plant) site is required five years from the date of this review.

Attachment 1: Site Maps and Figures

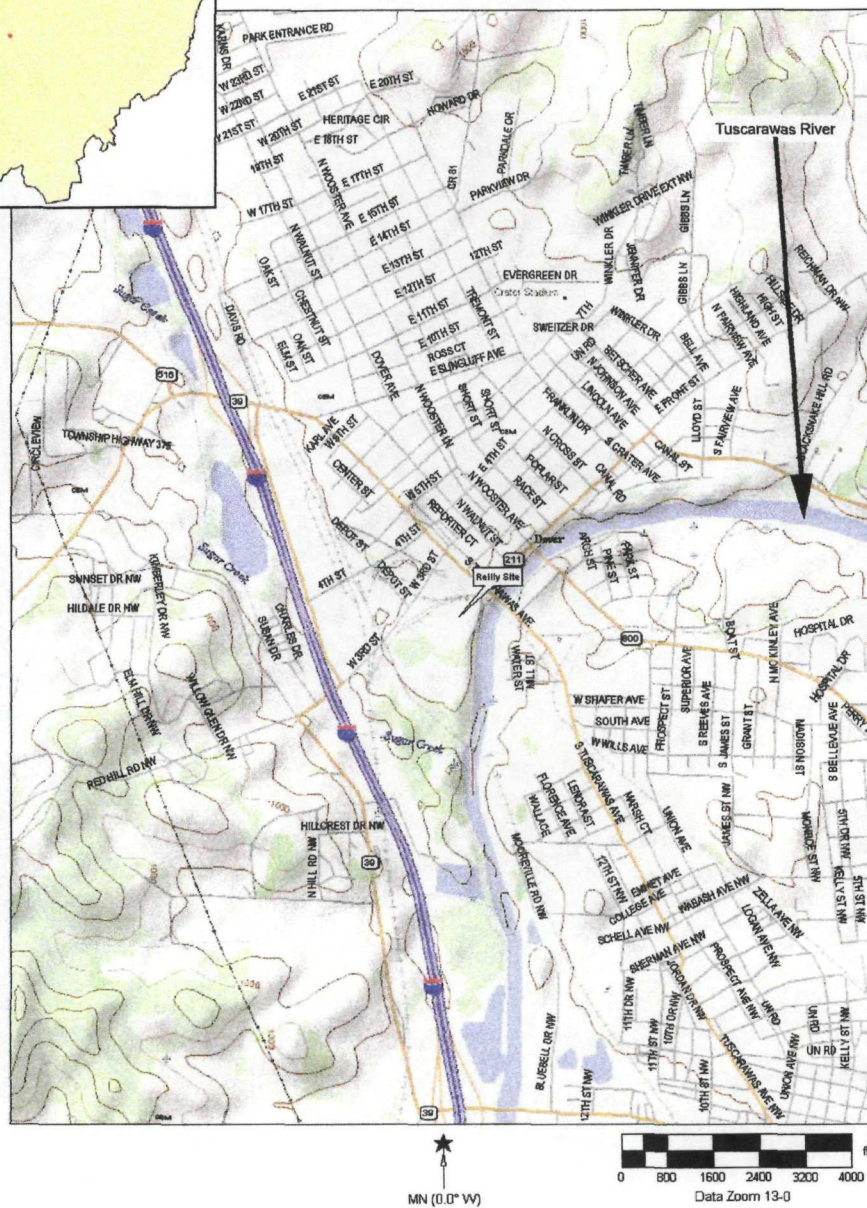
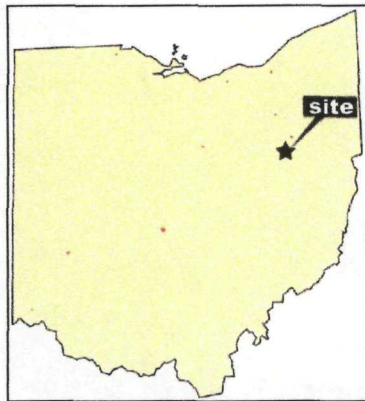


Figure 1: Site Location Map
 Five-Year Review
 Reilly Tar & Chemical Corporation Site
 Tuscarawas County
 Dover, Ohio

Prepared by Brenda R. Jones
 February 22, 2005

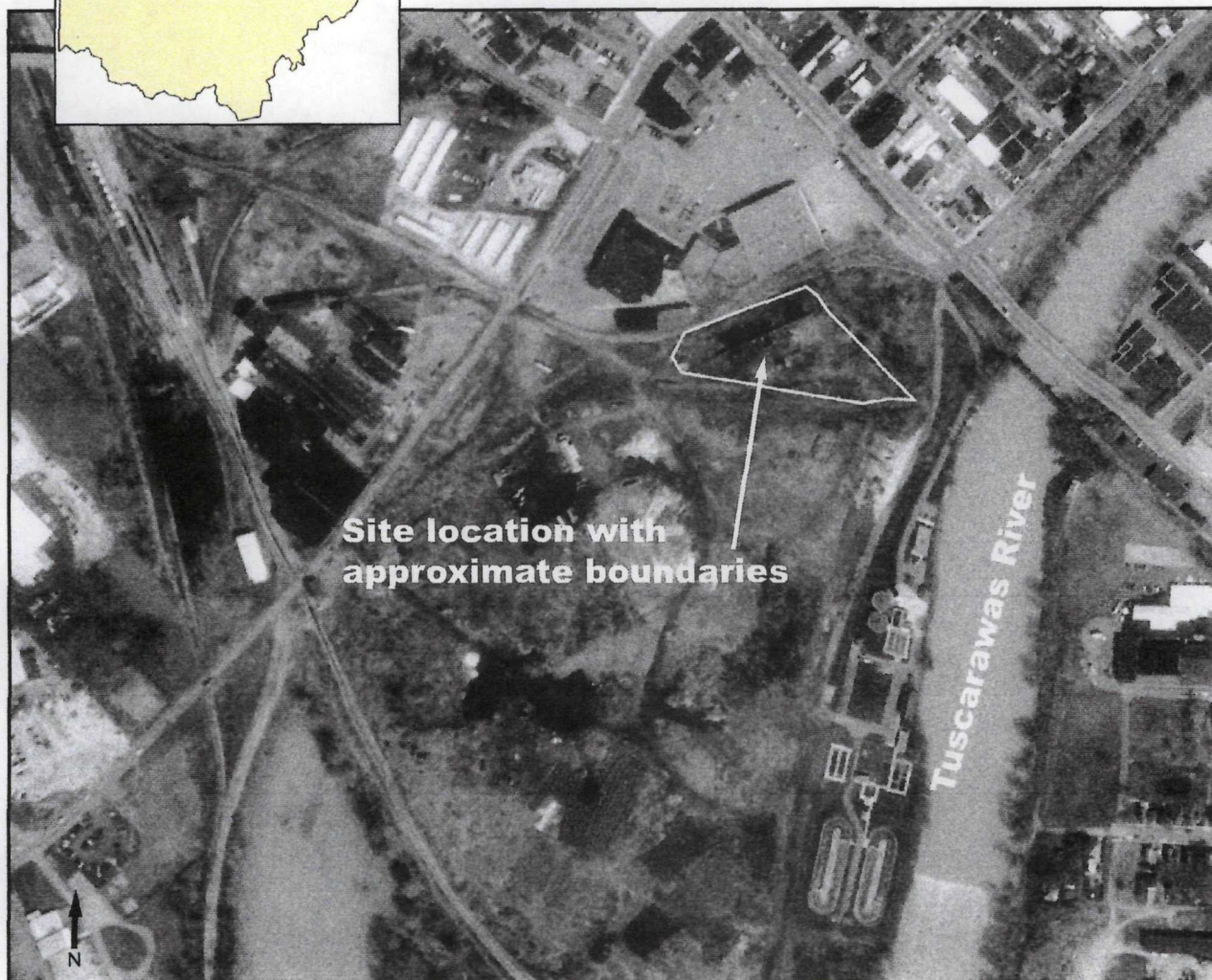
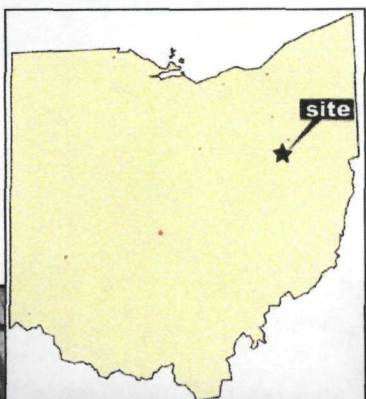


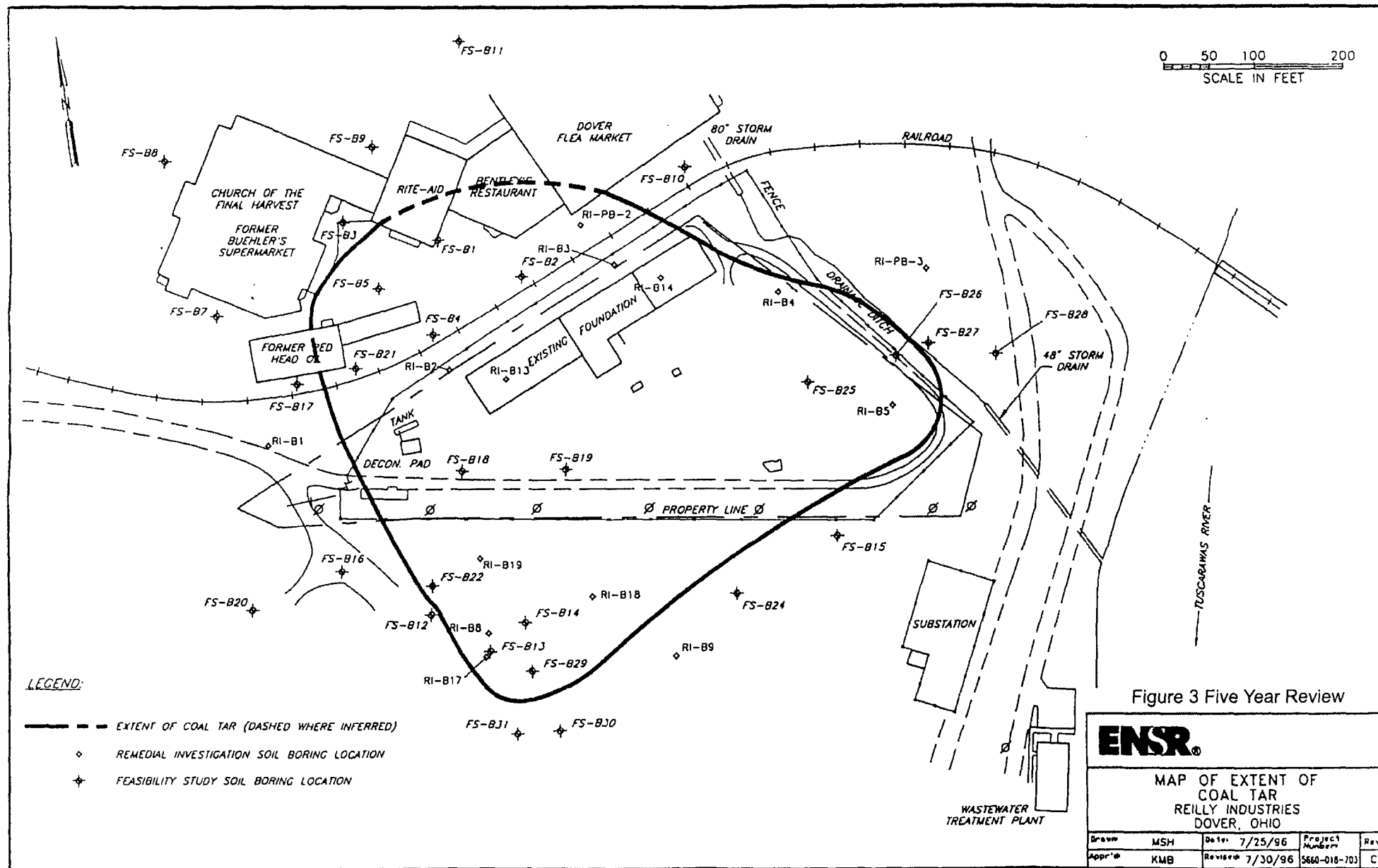
Image courtesy of the U.S. Geological Survey
photo taken 04/14/94

m 50 100 150
yds 50 100 150



Figure 2: Site Features Map
Five-Year Review
Reilly Tar & Chemical Corporation Site
Tuscarawas County
Dover, Ohio

Prepared by Brenda R. Jones
January 20, 2005



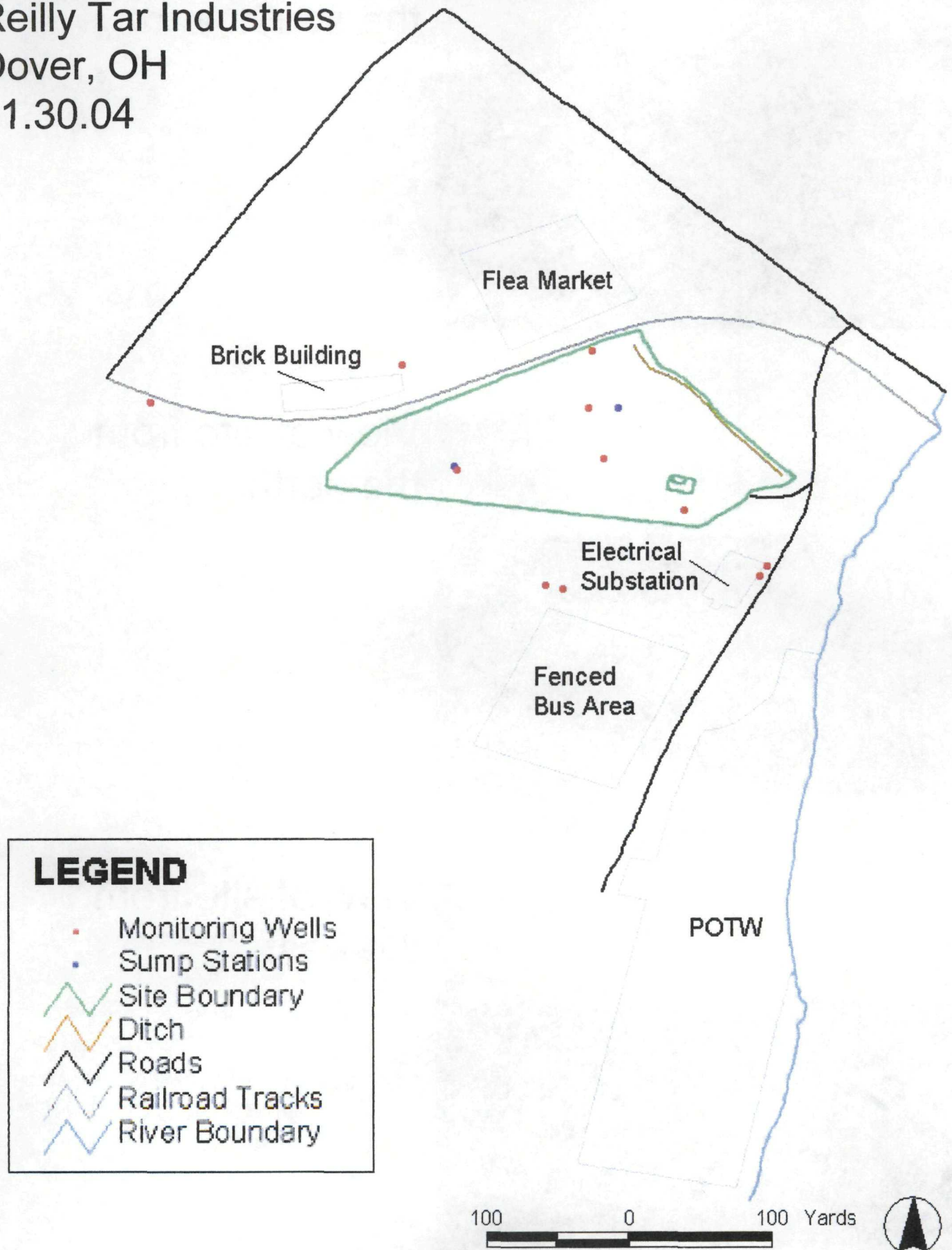
Attachment 2: Photos Documenting Site Conditions

Features located with GPS equipment

Reilly Tar Industries

Dover, OH

11.30.04





View of site from
the south.



View of site from
the north.



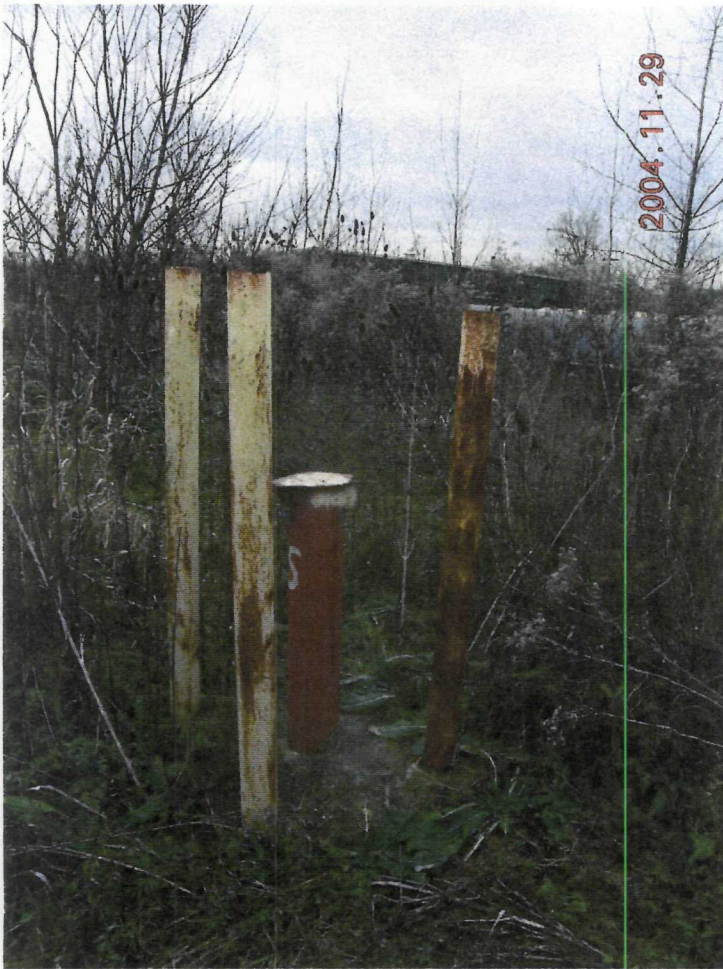
View of site from
the east.



View of ditch
looking
southeast.



View of ditch
looking
northwest.



Monitoring well 14S



Monitoring well
42 (A or B)



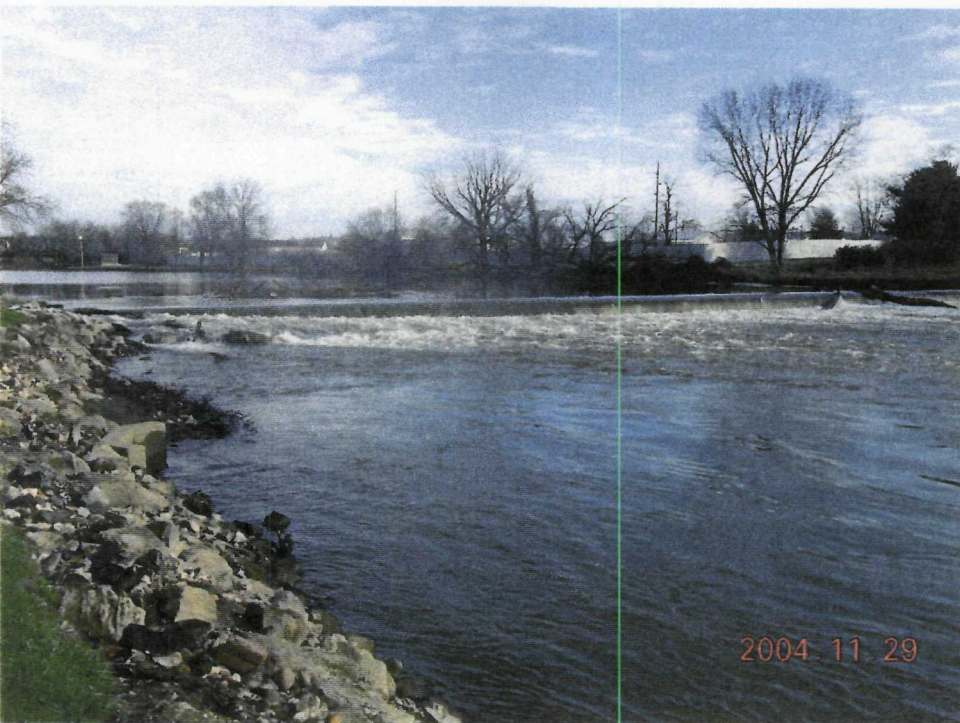
Electrical
Substation



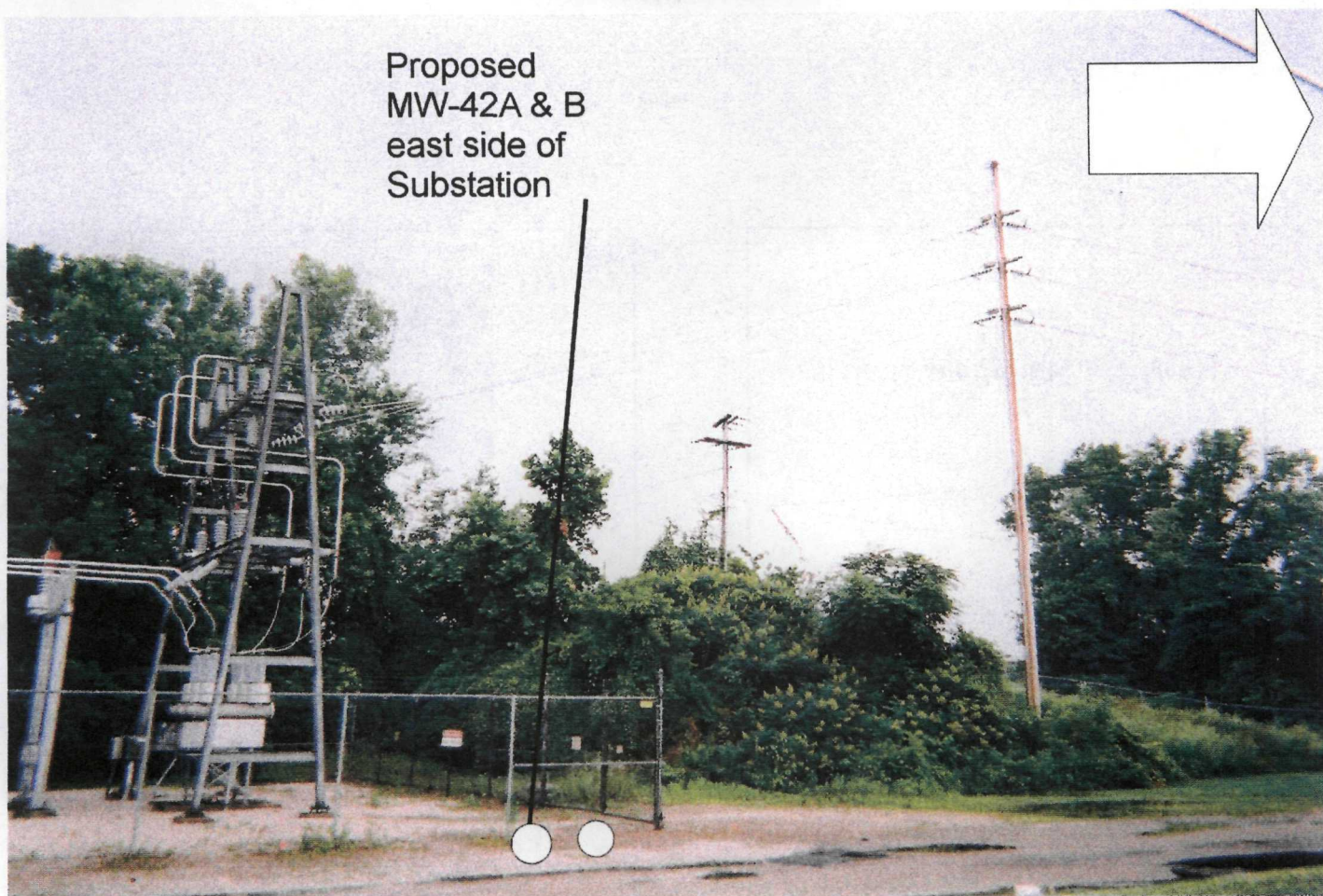
POTW



West bank
of the
Tuscarawas
River near
Electrical
Substation.



West bank
of the
Tuscarawas
River near
south side of
POTW.



Monitoring Wells 42 a & b installation
Photographs from OEPA

Reilly Tar Superfund Site Visit
April 21, 2005



Lined ditch facing north towards town



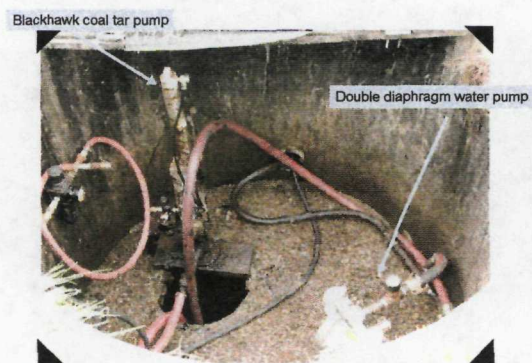
Lined ditch facing north towards town, note slope of site into ditch



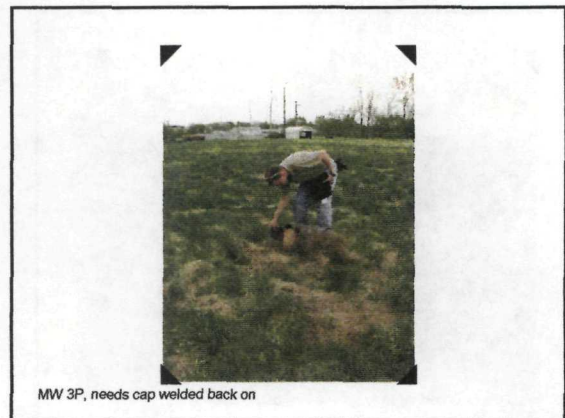
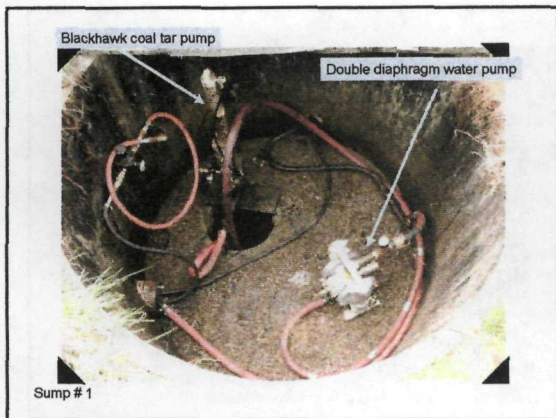
Lined ditch facing south towards Tuscarawas River, note growing vegetation



Lined ditch facing north towards town



Sump # 1





MW ?



Back side of pump house with coal tar drums stored on pad.



55 gallon drums of coal tar stored onsite near pump house



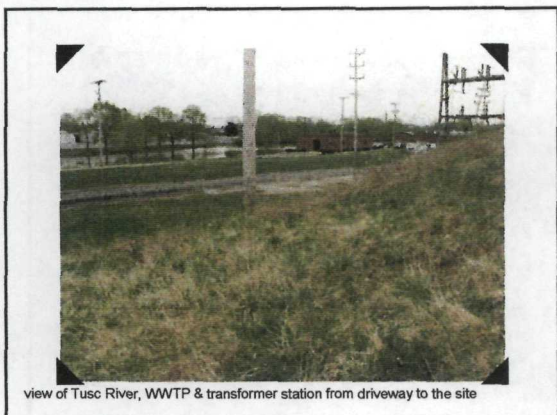
Concrete lined ditch used to store decon water during previous site actions. Note that manhole cover is not linked to the local WWTP



MW 4s



MW 14p and 14s



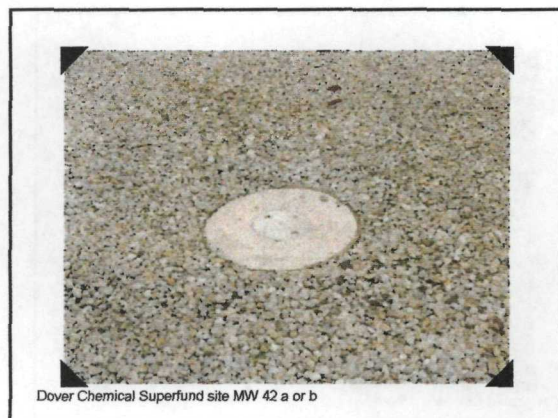
view of Tusc River, WWTP & transformer station from driveway to the site



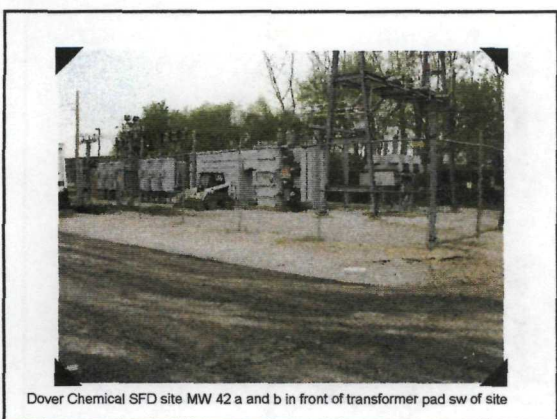
view of pump house, site and gate to the site



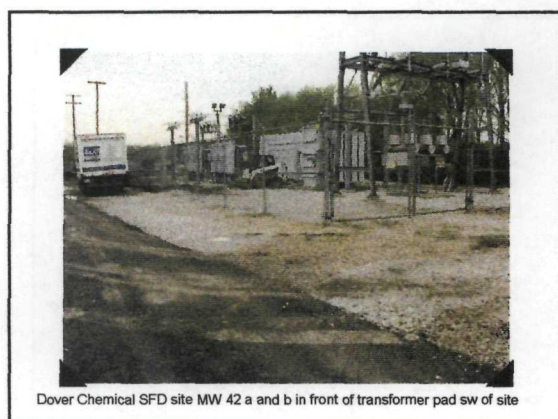
Dover Chemical Superfund site MW 42 a or b



Dover Chemical Superfund site MW 42 a or b



Dover Chemical SFD site MW 42 a and b in front of transformer pad sw of site



Dover Chemical SFD site MW 42 a and b in front of transformer pad sw of site



Tuscarawas River, bank erosion and bridge



Tuscarawas River and bridge



Tuscarawas River and bridge



Panorama of Tuscarawas River, bank erosion and bridge



Tuscarawas River, bank erosion and bridge



Tuscarawas River and Wastewater Treatment Plant (WWTP)



Tuscarawas River and railroad bridge downstream from site



MW ? Inside fence on north side of site



City well outside of the fence on north side of site



Reilly well outside of the fence on north side of site



Reilly well outside of the fence on north side of site.
Note site fence and hill in background



MW 1s outside of the fence on north side of site



MW 1s outside of the fence on north side of site

Attachment 3: List of Documents Reviewed

List of Documents Reviewed

August Mack Environmental Inc. 1998. *Final Remedial Design Work Plan, Former Reilly Industries, Inc. Site, Dover, Ohio.* May 22, 1998.

August Mack Environmental Inc. 1999. *Final Design Document Former Reilly Industries, Inc. Site, Dover, Ohio,* March 12 1999.

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2002: 1st, 2nd, 3rd & 4th quarters
2003: 1st, 2nd, 3rd & 4th quarters
2004: 1st & 2nd quarters

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ENSR, 1996, *Reilly Tar and Chemical Corporation, Dover, Ohio, Feasibility Study Prepared for Reilly Industries,* August, 1996.

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US EPA. 1997 *Proposed Plan Reilly Tar and Chemical Corporation Superfund Site,* Dover, Ohio, January 1997.

US EPA 2000. *Superfund Preliminary Site Closeout Report, Final Remedial Action for Reilly Tar and Chemical Site, Dover, Ohio.* September 9, 2000.

Statement of Work for the Remedial Design and Remedial Action, Reilly Tar and Chemical Site, Tuscarawas County, Ohio

CERCLA RD/RA Consent Decree, Dover Ohio, September 4, 1998

Attachment 4:
US EPA Region 5 Groundwater Evaluation and Optimization System
(GEOS) Evaluation



SUBTERRANEAN RESEARCH, INC.
33 ENTERPRISE PLACE, SUITE 5
DUXBURY, MA 02332
(781)-934-7199
DDOUGHER@SUBTERRA.COM

2 February 2005

David A. Wilson
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

RE: Reilly Tar & Chemical Corporation Site
Comments relating to perched groundwater

Dear Dave:

We have reviewed the data and documents sent by CD and emails regarding the Reilly Tar site, focusing on the status of the perched groundwater system vis-a-vis the objectives stated in the Record of Decision (ROD) for the site.

The purpose of perched groundwater monitoring is to determine whether remedy is accomplishing ROD-stated objectives. In particular, the ROD states (page 23) that one Remedial Action Objective is "Prevent migration of CPCs in the perched aquifer migrating to the drainage ditch or the regional aquifer." ("CPC" is an acronym for chemical of potential concern.) The remedy included construction of a concrete liner in the drainage ditch. The ROD discussion of the selected remedy (page 31) specifies "hydraulic control and collection of perched ground water". The ROD does not further define the spatial extent of the perched aquifer that should be controlled and collected.

We began by examining the adequacy of groundwater monitoring network in the perched zone to accomplish its purpose.

1. Quarterly groundwater monitoring reports prepare by August Mack through Quarter 2 (Q2) of 2003 state: "The spatial distribution of the wells comprising the monitoring

well network is adequate to characterize the approximate horizontal groundwater flow direction in both the perched saturated zone and the underlying shallow regional aquifer beneath the site.”

That is, a year and a half after starting the sumps, the groundwater monitoring network in the perched zone was considered to be adequate by Reilly's consultant.

2. The Q2 2003 quarterly groundwater monitoring report states that a “map depicting the perched groundwater flow at the site has not been included...due to insufficient survey data....Subsequent reports regarding the groundwater sampling activities will include a perched groundwater flow map.”
3. The Q3 2003 quarterly groundwater monitoring report changes language (emphasis added for changes): “The spatial distribution of the wells comprising the monitoring well network was adequate to characterize the approximate horizontal groundwater flow direction in both the perched saturated zone and the underlying shallow regional aquifer beneath the site prior to the installation of the collection trench.” Continuing, “[h]owever, with the installation of the collection trench and an intermittent pumping strategy, this spatial distribution becomes limited in the ability to establish specific groundwater flow patterns in the perched saturated zone.”

So, for the Q3 2003 report, the groundwater monitoring network in the perched zone is deemed **not** adequate by Reilly's consultant.

The paragraph continues (again, changes emphasized): Therefore, the groundwater flow data collected for this report is of limited value in determining the actual flow direction of groundwater in the perched saturated zone.”

Again, the report states the groundwater monitoring network is **not** adequate to determine the direction of groundwater flow in the perched zone.

4. The Q3 2003 quarterly groundwater monitoring report includes a groundwater flow map for the perched aquifer (report Figure 3), despite disclaimers (previous bullet) about the limitations of the data. The figure indicates groundwater south of the trench flows southwest and groundwater north of the trench flows to the west or northwest. A copy of the figure is attached as Figure A below.

The figure indicates high perched groundwater contours (note the 870 famsl, ft above mean sea level, contour) that cross the concrete-lined ditch is located in a swale on the northeast side of the site, which has a surface elevation of less than 865 famsl. It therefore appears that the mapped interpretation of the available data is incorrect, at least in the area near the ditch, and there are not enough direct

measurements of head in that region to develop a map of perched groundwater flow.

Therefore, the monitoring well network seems inadequate to resolve the groundwater flow configuration between MWRI-3P and the concrete-lined ditch (or along its alignment).

5. We have found no supplemental observations in the quarterly groundwater monitoring (e.g., visual examination along the ditch or along its alignment) to answer whether the RAO of no discharge of CPCs to the ditch is being accomplished.
6. Beginning with the Q4 2003 quarterly groundwater monitoring report, the language about adequacy (or inadequacy) of the groundwater monitoring network has been expunged. The reports do not contain perched groundwater head or flow maps, and no longer address whether the monitoring network is adequate.

We next examined the performance of the trench to collect perched groundwater.

1. Figure 3 from the Q3 2003 quarterly groundwater monitoring report (Figure A below) shows perched groundwater flow directions away from the trench, even in the vicinity of the trench. This indicates that the hydraulic monitoring well network does not detect hydraulic capture by the trench.
2. The same figure incorrectly maps heads, indicating no flows toward the concrete-lined ditch northeast of the property. As mentioned under item 4 in the previous paragraph, the earlier map of perched groundwater elevations (ENSR, "Technical Memorandum" Results of Performance of Addendum to the Site Specific Sampling Plan Remedial Investigation/Feasibility Study", Attachment F, July 1996), appears to have a more realistic contour shape northeast of MWRI-7P. This figure is attached as Figure B. In the absence of supporting data, there is no reason to believe that the collection trench has induced a hydraulic capture zone that extends to the southeast end of the ditch.
3. The available head data for the perched groundwater suggests that flow south of the trench is toward the southwest. The only downgradient well in that area is MWRI-14P. (MWRI-12P is at the southern head of the trench.) North of the trench, flow appears to be toward MWRI-11P, the only downgradient well in that area.
4. Sump discharges begin to be reported in December 2001 (in the electronic deliverable documents or EDDs), but do not appear in quarterly groundwater monitoring reports until Q3 of 2003. (Only 4 quarterly reports contain the discharge volumes.) We noted some inconsistencies between quarterly reports in the cumulative amounts of tar and water that reportedly have been pumped (differences between successive quarterly cumulative volumes do not always equal the reported quarterly volumes).

5. Water discharge rates from the sumps, which are averages inferred from the quarterly volumes vary from about 150 to 1140 gpd (gallons per day). These rates are significantly lower than the 2900 to 7200 gpd that were anticipated in the Final Remedial Design and ROD. To a certain extent, this may be due to the presence of more tar than was anticipated, which can partially obstruct the flow of water through the pore space of the perched saturated porous medium, as was suggested in Q3 2003 quarterly groundwater monitoring report. It may also be due to competition between tar and groundwater at the the filter “sock” put over the perforated pipe in the trench. Another possibility is the topography of the bottom of the perched saturated zone may not be pitched toward the trench over as large an area as was anticipated. In addition, the northeastern end of the trench may have become dry (MWRI-3P is often reported dry), reducing the effective length of the trench for capture of the perched groundwater. The implication is that the capture zone of the trench may be smaller than was anticipated.
6. In the absence of head measurements, an estimate of the width of the capture zone (measured perpendicular to the trench) can be obtained using calculations, reversing the order of terms that might be used during design. A highly simplified approach is to use the unconfined line-source equation $q = K(H^2 - h^2)/D$ that produces the flow rate per unit length of trench (q) in terms of the hydraulic conductivity K , the driving head H , the head in the trench h , and the width of the capture zone D . [Note that this equation includes inflows from both sides of the trench and neglects the end of the trench.] Rearranging this equation, the width of the capture zone can be calculated from $D = K(H^2 - h^2)/q = K(H^2 - h^2)/(Q/L)$ where Q is the trench discharge rate and L is the length of the trench. All of the terms on the right-hand side must be estimated and must be in a consistent set of units.

One key parameter in this calculation is the hydraulic conductivity of the perched aquifer. The Remedial Investigation (RI) Report (Volume 1 of 2, Section 5.3.1, page 5-11) states “[e]stimates of the permeability of the perched aquifer are, however unavailable so ground water flow and contaminant transport velocities in the perched zone could not be estimated.” Nonetheless, there is some information that provides some guidance. The RI also states (same page) that the “hydraulic gradient in the perched aquifer is about an order-of-magnitude larger than that in the sand-and-gravel aquifer below. This suggests that the hydraulic conductivity of the perched aquifer is less than that of the sand-and-gravel aquifer.” It continues by noting that “[f]ree phase coal tar is present above the clay layer in the perched aquifer on site.” Together, these suggest that the average hydraulic conductivity of the perched aquifer is no more that one tenth (0.1) of the hydraulic conductivity of the shallow sand-and-gravel aquifer, and that the effective hydraulic conductivity may be substantially reduced because of the obstruction of pores by coal tar.

In situ hydraulic conductivity tests in the shallow aquifer (Appendix I of Volume 2 of the RI) yielded a range of values, from 27.8 to 71.2 ft/d, and a geometric mean of 43.4 ft/d. (The geometric mean is used assuming that the hydraulic conductivity

is lognormally distributed.) We therefore estimate the perched zone hydraulic conductivity is 0.01 to 0.1 times 43.4 ft/d, i.e., 0.434 to 4.34 ft/d.

The discharge rates from the sump have been reported above, and range from 150 to 1140 gpd. There is no clear single value of the driving head, so we estimate $H = 5$ ft. At the sump, the height of the seepage face is estimated to be $h = 0.5$ ft. The final parameter, the trench length L , is approximately 400 ft.

Combining these, the capture width is estimated to lie in the range $D = 28$ to 2150 ft. This is a huge range and clearly indicates the need for head measurements within the capture width. Existing head measurements invalidate the upper end of the calculated D , but the remaining range is still large. The only way to constrain these estimates is through head measurements, but they are not available.

Determining the adequacy of the hydraulic capture and control of the perched groundwater depends on the areal extent of contamination that needs to be hydraulically controlled.

1. No water quality measurements are reported for either of the so-called downgradient wells, MWRI-11P and MWRI-14P (nor indeed for any other perched groundwater monitoring wells). In fact, no contamination samples in the perched zone have ever been reported in the monitoring reports. It is therefore not possible to assess the current extent of groundwater contamination from groundwater quality measurements obtained during the operation of the remedy.
2. A map with posted cPAH (carcinogenic polycyclic aromatic hydrocarbon) and B(a)P-TE (benzo(a)pyrene toxicity equivalent) soil contamination results from test pits appears as Figure E-1 of the Final Design Report, Volume 1 [August Mack, 1999, page 124 of 515 in the pdf file]. Most of these samples were obtained south of the current trench location. A copy of the figure is attached below as Figure C.

Since the location of perched groundwater plume at that time should be expected to be correlated with the test pit results, the cPAH can be contoured to indicate where the perched plume footprint would be expected. The result appears to have a major lobe extending from the northern half of the trench line toward the southeast corner of the property, with a second, minor lobe extending toward the southwest boundary of the site.

3. The 1996 ENSR Technical Memorandum includes a map of the extent of visually observed coal tar in the subsurface. This map (Attachment C of the Technical

Memorandum) is attached below as Figure D. The impacted zone extended across the property and offsite.

4. Comparing these maps with a perched groundwater flow map (either the 1996 or 2003 map will do), it is readily apparent that there is unmonitored potential for migration of CPCs offsite in the perched groundwater. Additional monitoring, including water quality sampling, of the perched groundwater is indicated.
5. In the shallow sand-and-gravel aquifer, water quality samples at MWRI-4S indicate the presence of BTEX and PAHs in groundwater from the shallow aquifer, while water quality samples at MWRI-2S are nondetects. MWRI-1S and MWRI-14S, the other two shallow wells listed in the quarterly monitoring reports, were sampled in August 2001, but not in any of the subsequent monitoring events. (A footnote in the results table in the quarterlies indicates the other wells were not sampled because only MWRI-4S had any detections. They are also located some distance from the collection trench.) Only these 4 shallow monitoring wells are listed in the quarterlies. Determining the extent or degree of contamination in the shallow zone while limited to using these four wells is unreasonable.

We noted some data that were not available in the information provided us:

- Survey information in EDDs: The coordinates for a number of groundwater monitoring wells are not provided in the EDD for the site.
- Sump discharge rates: In the data available to us, we have not found reports of any quarterly water and tar pumped volumes prior to Q3 2003.

In summary, our review leads to the following conclusions regarding perched groundwater.

- Additional perched groundwater head data are needed to determine whether there is any discharge to, or along the alignment of, the ditch, as this is a remediation objective described in the ROD.
- Additional head data are needed to determine whether the trench is hydraulically controlling the flow of perched groundwater as intended by the design. The capture zone of the trench currently cannot be determined.
- Water quality samples from the perched zone are needed, along with the head data. As it has been roughly a decade since the last evaluation of the extent of the perched zone plume, we encourage a synoptic round of samples. Such water quality samples are not required to locate head monitoring wells to determine the extent of hydraulic capture. However, if additional water quality monitoring wells in the perched aquifer need to be located, then such samples could help with the selection of monitoring well locations. These data will provide an updated estimate of the perched plume configuration.
- The two on-site shallow monitoring wells currently monitored are not sufficient to determine whether the perched contamination has impacted the sand-and-gravel, except at these 2 locations. Water quality sampling from additional locations from the shallow groundwater zone is needed at the site to detect contamination in the lower aquifer. If

detected, then the additional sampling locations will be used to determine the extent and degree of contamination.

We plan to extend this review of the status of the monitoring network to develop suggestions to improve it. Please feel free to contact me (781-934-7199 or ddougher@subterra.com) with any questions or to discuss these findings.

Sincerely,

SUBTERRANEAN RESEARCH, INC.

David E. Dougherty, Ph.D.

Attachments: 4 Figures

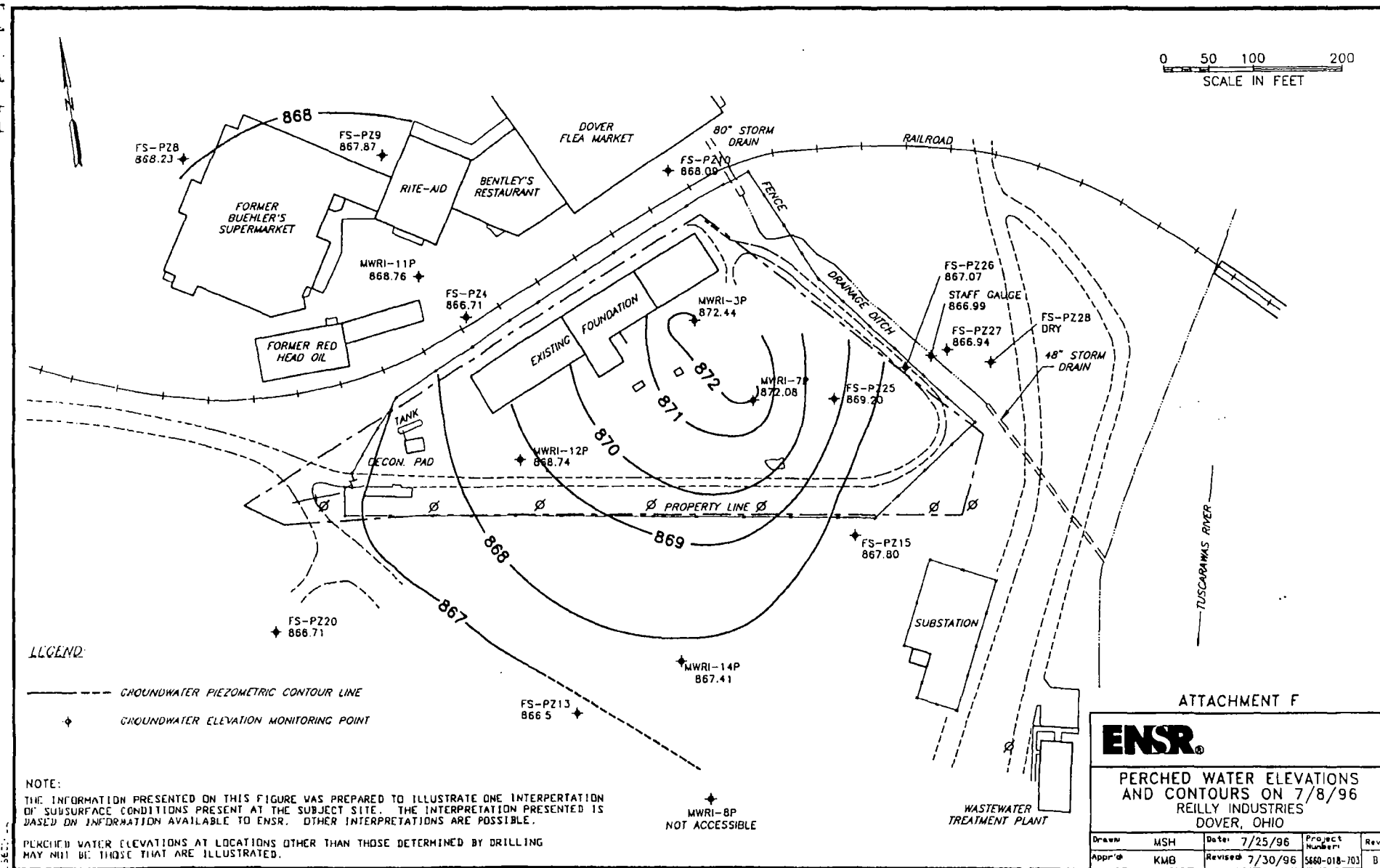


Figure B—Perched groundwater head map from Technical Memorandum of 1996. Note southeast quadrant of property.

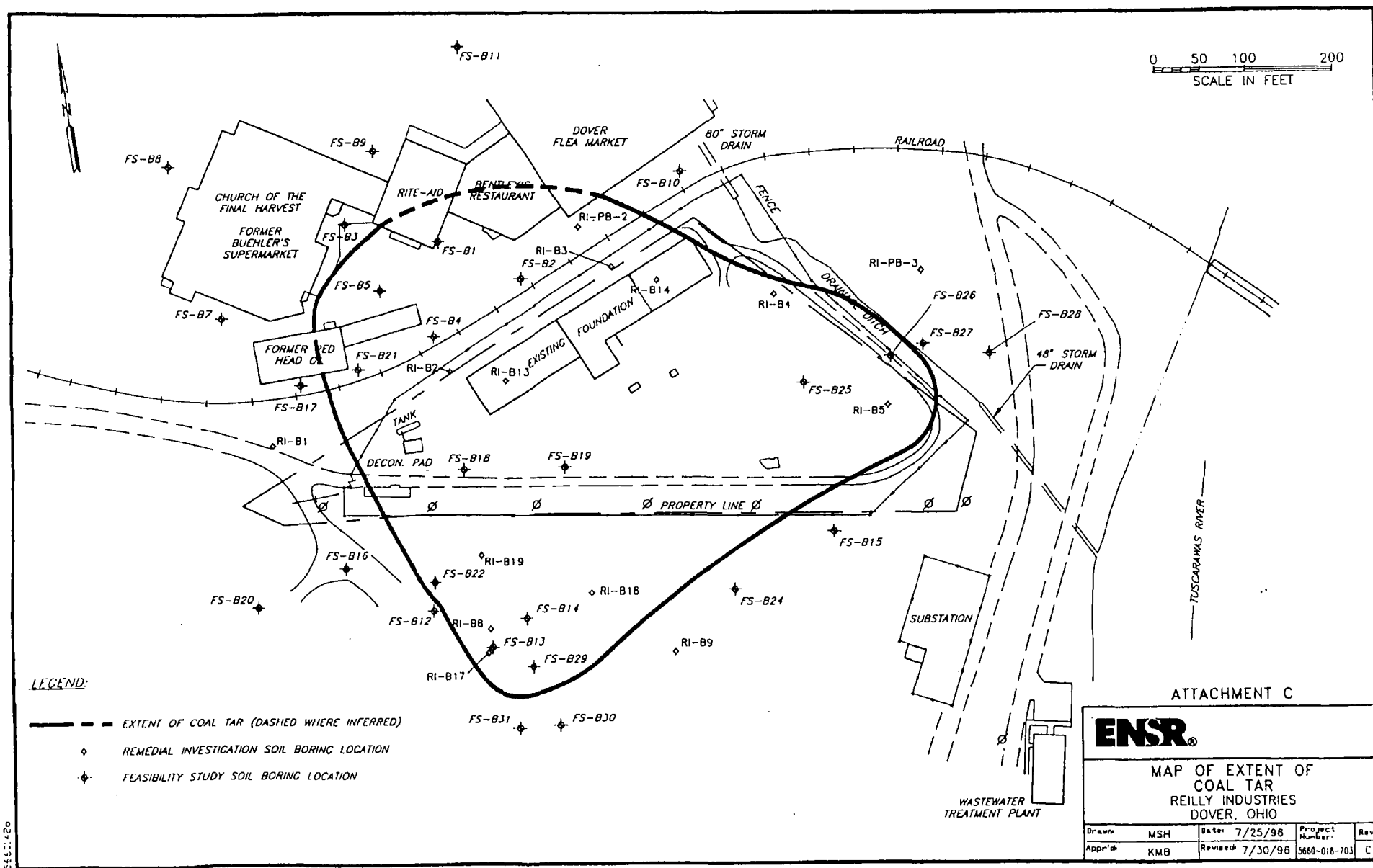


Figure D--Coal tar extent from Technical Memorandum, 1996.

Attachment 5: Institutional Control Information

To: Brenda Jones, USEPA
From: Bill Glaze, August Mack Environmental, Inc.
CC: John Jones, Reilly Industries
Christine Osborne, OEPA - SE
Date: 1/25/2005
Re: Enforcement of City Ordinance, Local Zoning, and Deed Restrictions.

Dear Mrs. Jones:

Pursuant to our November 30, 2004 meeting, August Mack Environmental, Inc. (August Mack) is pleased to provide this technical memo regarding the Reilly Dover Facility. The requested information includes the enforcement and effectiveness of city ordinances regarding potable water well installation, local zoning status, deed restrictions, and site security. This memorandum summarizes August Mack's findings.

According to the City of Dover, Ohio codified ordinance 925.16(b) "The drilling and establishment of private water supply wells (as defined in Ohio R.C. 3701.344) shall be permitted for purposes other than human consumption (i.e., irrigation, manufactured cooling purposes, etc.) No physical connections between private water well lines and water lines supplied by the Municipal water supply system shall be permitted. (Ord. 56-96. Passed 11-4-96.)" According to correspondence with Dave Douglass, City Service Director, the following enforcement methods are used to prevent violation of the ordinance:

- Anyone planning to drill a well must apply for a permit through the City Director's Office.
- Water meters and backflow devices must be installed and are inspected by meter service personnel to determine adherence to city ordinances.
- Irregularities in meter readings are reported for investigation by a certified meter inspector.
- When water utilities notice a dramatic change in water usage, property inspections are conducted.
- All reports from local residents, regarding possible violations of the ordinance, are investigated.

Correspondence with Kenny Beitzel, City Building Inspector, verified these methods. According to both Dave Douglass and Kenny Beitzel, efforts within the local community, in conjunction with city service personnel have been highly effective in the enforcement of this ordinance.

August Mack contacted local drilling companies in order to gain an understanding of the process of potable water well installation. This process is discussed below:

Water well contractors are registered with the state health department to conduct business in Ohio. This registration and prerequisite bonding requirements afford the consumer with protection against violations of state water well rules.

Once a certified driller is contacted by a property owner, and is requested to install a potable water well, the driller must first apply for a "permit to install". This permit is obtained through the county health department. The health department will notify the driller of any property restrictions, exemptions, or other existing permits of the property. If restrictions apply to the property, the county health department will not grant a permit. In many applications, a health department worker will make a visit to the property for further assessment. Furthermore, any driller attempting to drill a potable water well on a property without first obtaining a permit, is punished by fine by the health department.

Potable water wells are registered with both the state and local health departments. Upon completion of a new potable water well, it is required that a completion form be sent to the state and local health departments. The property owner, and drilling company also retain a copy of the completion form. Non-compliance results in a penalty enforced by the health department.

Kenny Beitzel informed August Mack that the current zoning status of the site is "M-2 General Industrial." Currently, there are five zoning classifications utilized the city of Dover.

- "B-1" (Local or Community Shopping Center) – Retail Goods including food, apparel, hardware, etc., and services including both professional and personal services.
- "B-2" (Highway or General Business) – Motels, restaurants, automotive services, etc.
- "B-3" (Central Business) – Public uses, schools, offices, banks, etc.
- "M-1" (Restricted Industrial) – Restricted manufacturing, printing, publishing, research and test facilities, etc.
- "M-2" (General Industrial) – General manufacturing, sale and storage of building materials, wholesale business, warehousing, sand and gravel extraction, etc.

A detailed description of zoning codes as described in the Dover City Ordinance, including permitted and conditional uses, can be found in **Attachment A**.

In addition to the city ordinance against private drinking water wells, the property owners filed a deed restriction that limits the use of the property to industrial use only. In order to ensure that this deed restriction was properly recorded, August Mack contacted the county clerk, who verified the presence of the deed restriction as recorded in the Tuscarawas County Deed records volume 214, page 142. The affidavit filed for record with the County of Tuscarawas can be found in **Attachment B**. According to records maintained by the Tuscarawas County Court House, the property that was previously owned and operated by Reilly Industries, Inc. (Reilly) is currently owned by Mr. And Mrs. Quillen.

The above-mentioned affidavit states that the site is the subject of a Consent Decree. According to the Consent Decree, there is a "Notice of Obligations to Successors-in-Title", which provides that the owners record certain notices in the Tuscarawas County Recorder's Office. One such notice is a

“Notice of Entry of Consent Decree”, which asserts that each deed shall contain a notice stating that the property is subject to this Consent Decree.

An eight (8) foot chain-link fence currently encloses the property. The top of the fence includes a three (3)-row barbwire barrier. The only access to the property is a pad-locked vehicle gate located at the north end of the property. August Mack possesses the only keys to this entrance. Inspections take place on a monthly basis, in order to assess the condition of the fence. A typical inspection is comprised of a walkover of the grounds and a survey for structural damage including broken links, fallen or pushed over posts, burrows beneath the fence, or lipped barbwire. Since the installation of the fence, visual inspections have not identified any areas requiring repairs.

Attachment A
Zoning Status Codes

1141.03 BUSINESS AND INDUSTRIAL DISTRICT PERMITTED AND CONDITIONAL USES.

PERMITTED USES				
"B-1"	"B-2"	"B-3"	"M-1"	"M-2"
Local or Community Shopping Center	Highway or General Business	Central Business	Restricted Industrial	General Industrial
Retail goods:	Retail business	Retail Business	Restricted manufacturing	General manufacturing
Food	Personal services	Personal services	Printing & publishing	Manufacturing, sale & storage of building materials
Apparel	Business services	Business services	Research & testing facilities	Transport & trucking terminals
Hardware	Professional activities	Professional activities	Offices <i>delete</i>	Wholesale business
Home furnishings	Offices & banks	Commercial schools	Public service facilities	Warehousing
Eating & drinking	Service stations	Offices & banks	Essential services	Sand & gravel extraction
Services:	Restaurants & taverns	Restaurants & taverns	Accessory uses	Agriculture
Professional	Motels & hotels	Automotive sales & repair	Agriculture	Food processing
Personal	Entertainment facilities	Hotels & motels		Grain elevator
Business	Essential services	Entertainment facilities		Offices
Financial	Accessory uses	Mortuaries		
Entertainment	Automotive sales & repairs	Public uses		
Essential services	Funeral homes	Semipublic uses		
Accessory uses	Mortuaries	Social activities		
		Essential services		
		Accessory uses		
CONDITIONAL USES REQUIRING BOARD APPROVAL				
Gasoline stations	Semipublic uses	Gasoline stations	Outdoor advertising	Restaurants
Drive-in banks	Outdoor advertising	Wholesale business	Food processing	Outdoor advertising
Public uses	Wholesale business	Drive-in commercial uses	Furniture manufacturing	Mineral extraction, storage & processing
Semipublic uses	Sale or storage of building material	Animal hospitals or clinics	Wholesale business	Auto & metal salvage operations
	Printing & publishing	Recreational facilities	Bakeries & dairies	Stockyards
	Food processing	Outdoor advertising	Warehousing	Slaughterhouses
	Animal hospitals & clinics	Tourist homes		Petroleum refining & storage
	Bakeries & dairies	Printing & publishing		Oil & gas wells

(Ord. 25-82. Passed 5-3-82.)

Attachment B

Affidavit Filed for Record With the County of Tuscarawas

Aug 02 04 02:52p

Wendy Derr

3303648654

p. 2

VOL 736 PAGE 626

9800014263
 Filed for Record in
 TUSCARAWAS COUNTY, OH
 DOLORES HIXSON
 On 10-05-1998 At 02:26 pm.
 AFFIDAVIT 18.00
 Vol. 736 Pg. 626 - 628

**Affidavit On Facts Relating To Title
 (O.R.C. §5301.252)**

STATE OF OHIO)
)ss
 COUNTY OF TUSCARAWAS)

The undersigned being first duly sworn hereby state that they are persons having knowledge of the facts set forth herein and competent to testify concerning them in open court. affiants further state that:

1. They are the "Owners" of a certain parcel of real estate located in the City of Dover, County of Tuscarawas and State of Ohio, which parcel is more particularly described on the attached Exhibit "A", and is referred to hereafter as the "Site".
2. The Site was acquired as part of a larger conveyance to the affiants recorded at Volume 616, Page 207, Tuscarawas County Deed Records.
3. The Site is the subject of a Consent Decree in *United States of America v. Reilly Industries, Inc.*, #5:98CV 1409, filed with the clerk of the United States District Court for the Northern District of Ohio in Cleveland on June 18, 1998, at 3:22 p.m.
4. Paragraph #9 of said Consent Decree, "Notice of Obligations to Successors-in-Title," provides that the defendant in said case shall use its best efforts to have the Owners record certain notices in the Tuscarawas County Recorder's Office.
5. These notices are:
 - a. Notice of Entry of Consent Decree - Each deed, title or instrument conveying an interest in the property included in the Decree shall contain a notice stating that the property is subject to this Consent Decree and shall reference the recorded location of the Consent Decree and any restrictions applicable to the property under this Consent Decree.
 - b. Notice of Obligation to Provide Access - Owner(s) (affiants) have agreed with Riley Industries to provide access to the Site in remedial action and that each subsequent instrument conveying an interest in any such property included in the Site shall reference
6. This Affidavit on Facts Relating to Title is made by the affiants as Owners of the Site to effectuate and implement the terms of the Consent Decree and to provide public notice that the site is subject to the Decree and to agree for access pursuant to said Decree.

Aug 02 04 02:52p

Wendy Derr

3303648654

p. 4

VOL 736 PAGE 628

EXHIBIT "A"9800014263
MILLER & KYLER
PICK UP**The Site**

Being situated in the City of Dover, County of Tuscarawas and State of Ohio:

And being a part of Slingluff's Heirs Second Addition to Dover and a part of Christian Deardorff's Administrator's Subdivision and being more fully described as follows:

Beginning at an iron pin on the Southeasterly right-of-way line of the Cleveland and Marietta Railroad, said pin being located the following two (2) courses from the intersection of Southwesterly line of Apple Alley with the Southeasterly line of Second Street in said City of Dover; South 45° 48' West, 150.0 feet and South 44° 12' East, 203.7 feet; thence from said intersection beginning South 44° 12' East, 404.5 feet to an iron pin; thence South 23° 37' West 91.8 feet to an iron pin; thence North 82° 13' West, 602.25 feet to an iron pin; thence North 86° 12' West, 158.4 feet to an iron pin; thence North 57° 03' West, 54.3 feet to a pig iron monument on the Southeasterly right-of-way line of the aforementioned railroad; thence with said right-of-way line, North 65° 33' East, 609.8 feet to the place of beginning, containing 3.62 acres, of which 0.34 acre is in Lot #10, 0.43 acre is in Lot #11, 0.50 acre is in Lot #12, 0.54 acre is in Lot #13, 0.45 acre is in Lot #14, 0.37 acre is in Lot #15, 0.29 acre is in Lot #16 and 0.44 acre is in Lot #17, all of said Lots being in Slingluff's Heirs' Second Addition to Dover and 0.44 acre is in Lot #1 of Christian Deardorff's Administrator's Subdivisions in Dover.

The above described premises consist of all of the following two parcels of real estate record in Tuscarawas County, Ohio:

- 1.) All of the premises conveyed to P.J. Lewis Manufacturing Company by The F. J. Iron Coal Company by deed dated August 5, 1921 and recorded in Tuscarawas County Deed Record Volume 193, Page 287.
- 2.) All of the premises conveyed to International Combustion Tar and Chemical Corporation from The Valley Furnace Company by deed dated May 29, 1931 and recorded in Tuscarawas County Deed Record Volume 214, Page 142.

Attachment 6: Site Visit Trip Report

Reilly Tar and Chemical Corporation Site Visit

April 21, 2005

Prepared by Brenda R. Jones

Present at the site visit were:

Chris Osborne (CO) – Ohio Environmental Protection Agency

John Jones (JJ) – Reilly Industries

Bill Glaze (BG) – August Mack

Brian Petriko (BP) – August Mack

Brenda Jones (BRJ) – US Environmental Protection Agency

BRJ arrived on site at 2:10 pm, all others were already present.

After pleasantries were exchanged we got right into the site inspection. BRJ explained that this visit was performed as part of the 5-year review of the site. All parties acknowledged this.

All parties then walked the site and discussed current and past status of the remedial action and operation and maintenance. BRJ took several pictures with a Nikon Coolpix 8800 digital camera. These images are attached.

Site notes and observations:

- The ditch appears to be ok, no cracks in the lining. Flowing water was present along with cattails and the beginning growth of other vegetation (see images).
- There is a silt fence on either side of the ditch that appears to be in working condition.
- There is some sediment and gravel present in the ditch.
- Sumps and pumps are operating as normal. BG stated that that product levels seem to drop with the water table, when the water table is low, the product is low, when the water table is higher, more coal tar is present.
- August Mack visits site every two weeks for maintenance and to pump down the tar.
- 70% of the underground trench flows towards sump #2.
- Sump #1 pumps water 5 minutes out of every ½ hour.
- Sump #2 pumps water 20 minutes out of every ½ hour.
- The product is pumped every two weeks into 55 gal drums and stored on site.
- Approximately every 6 months, a 55 gal drum is filled. This means four barrels a year (two each from two sumps) are generated.
- The majority of the coal tar is pumped from the pumping system and not from the sumps.
- Once per year, August Mack recovers coal tar from both the oil/water separator and the 1,200 gallon poly tank. Since the beginning of the remedial action, approximately 4000 gallons (roughly 1,500 gal/year) have been recovered. This includes the sumps and the system.

- The coal tar is recycled by Kipin Industries, Indianapolis for Citizens Gas once each year.
- Coal tar is recovered from the system utilizing a vacuum box provided by UST Environmental, Inc. Recovered coal tar is then transported by UST Environmental, Inc. to Kipin Industries for recycling.
- The site is surrounded by a chain link fence with three strands of barbed wire on top. The fence, barbed wire and gate appear to be in working condition, no holes were noted.

Problems noted:

- The on-site landfill, which is higher in elevation than the rest of the site, is vegetated. However, there is an approximate 20 ft by 20 ft area of brown vegetation. August Mack indicated that it was vegetation that had not yet greened up for the spring. If, however, the vegetation does not come back, August Mack will reseed the area.
- Vegetation needs to be cleared out of the lined ditch.
- MW 3 P needs to have its lid welded back on.
- Not all MW were numbered. CO suggested having the MW numbers carved into the well casing using soldering equipment, since paint wears off with time.
- There are a few small areas on top of the cap where vegetation needs reseeding or erosion is occurring (see photo of standing water on cap). August Mack indicated they would fill in and reseed these areas.

Other activities

- All parties discussed schedule of five-year review report.
- BRJ reviewed USEPA's attorney comments on institutional controls. August Mack agreed to look into the issues, while BRJ agreed to send the written excerpts concerning IC comments to Reilly and August Mack.
- BRJ agreed to email to Reilly, August Mack and OEPA copies of the comments made by USEPA GEOS on the long-term groundwater monitoring program.
- All parties drove to view offsite monitoring wells, north of the site (see images).
- CO took BRJ to the county courthouse in New Philadelphia to identify its location.

All parties left the site by 4:15 pm.

Inspection of site information repository at Dover Public Library by BRJ: 5:15 pm

- The repository is present.
- It is readily accessible to the public as it is on shelves in the open, general area of the library.

- The librarian I spoke with knew immediately what I was talking about and took me right to where it was shelved.
- The Reilly Tar repository seems to be commingled with the Dover Chemical repository documents.
- There is no index of what is present or should be present for either site.
- The repository needs organizing.
- Some documents appear damaged by water from a source unknown.
- I found the Reilly Tar RI/FS and the human health risk assessment readily.

**Appendix: Comments received from Support Agencies and/or the
Community**



State of Ohio Environmental Protection Agency

Southeast District Office

2195 Front Street
Logan, OH 43138

TELE: (740) 385-8501 FAX: (740) 385-6490
www.epa.state.oh.us

Bob Taft, Governor
Bruce Johnson, Lieutenant Governor
Joseph P. Koncelik, Director

May 26, 2005

**RE: TUSCARAWAS COUNTY
REILLY TAR & CHEMICAL
DOCUMENT REVIEW**

Brenda Jones
U.S. EPA, Region 5
SR-6J
77 W. Jackson Blvd
Chicago, IL 60604

Subject: Comments on the draft First Five Year Review of the Reilly Tar remedy

Dear Brenda:

Ohio EPA has completed its review of the draft Five Year Review Report for the Reilly Tar and Chemical site in Dover, Ohio. This document was received via email on May 3, 2005, and via US mail on May 6, 2005.

Ohio EPA agrees with the conclusions in the report. The ground water remedy needs to be reevaluated and upgraded as necessary. The report clearly highlights the problems with the current sampling plan.

I have attached Ohio EPA's comments. The comments are primarily clarification or typographical in nature. If you have any questions, please do not hesitate to contact me at 740-380-5258 or via email at chris.osborne@epa.state.oh.us.

Sincerely,

Christine Osborne
Site Coordinator
Division of Emergency and Remedial Response

CO/jg

Attachment

c: Doug Snyder, DDAGW, SEDO

**COMMENTS ON THE DRAFT
FIRST FIVE-YEAR REVIEW REPORT
FOR
REILLY TAR and CHEMICAL SITE**

General Comment: Table 2 presents the Annual O&M Costs. Given the wide discrepancy in the annual costs, and what appears to be increases over the estimates included in the ROD, should the estimated O&M costs be redeveloped by Reilly Industries? Also, is Reilly Industries required to carry proof of a financial mechanism to guarantee that O&M tasks will be conducted in the event of a bankruptcy? Ohio EPA requires these mechanisms on all landfills and many other remedies that require long-term operation and maintenance.

1. **Five-Year Review Summary Form, cont'd., Issues: Item number 3.** States that additional information on stability of coal tar product on and off-site is necessary. Does this include identifying whether the black material found adjacent to the electrical substation is from the Reilly site? This statement appears to be more about the stability of the coal tar as opposed to where it came from and whether any remediation is necessary.
2. **Page 3, Land Resource Use, 3rd paragraph:** The first sentence of this paragraph states that there are no surface water bodies on the site. The second sentence states that storm water drainage ditch is adjacent to the site and is a surface water body. However, under CERCLA, the site is defined as wherever contamination has come to be located. The ditch did contain coal tar and was remediated by excavation of the coal tar and then lining the ditch with concrete in order to control the migration of the coal tar and contaminated ground water from the perched ground water zone to the ditch. Given this information, the ditch does appear to be part of the site. Please rewrite or clarify the first couple of sentences as appropriate.
3. **Page 4, paragraphs 3 & 5:** In the 3rd paragraph, the aquifer and its arbitrary designation into zones is discussed along with associated depths below ground surface. In the 5th paragraph, the bedrock aquifer is mentioned but no information is provided on how deep (feet below ground surface) this aquifer is. If this information is available, it would help the information on the depths of the various aquifers.
4. **Page 5, 4th paragraph, typo:** Please correct the spelling of 1,1,1-trichloroethane.
5. **Page 6, Basis for Taking Action, SEMIVOLATILES:** It is unclear what is meant by "3 + 4-methylphenol". What does the "+" sign indicate?
6. **Page 7, 2nd paragraph, 1st sentence, typo:** Change "...a ecological risk..." to "...an ecological risk...".

7. **Page 7, 4th paragraph, 1st sentence:** This sentence reads awkwardly. A potential rewrite is "The FS report evaluated several remedial action alternatives for each of the site components..."
8. **Page 7, Remedy Selection, 1st paragraph:** This paragraph summarizes the remedy for the site; however, the hydraulic control and collection trench for the perched aquifer is not mentioned. It should be included in this paragraph.
9. **Page 10, Remedy Implementation, 3rd paragraph, 2nd sentence:** I would suggest deleting the word "necessary" in this sentence. Instead of saying no additional wells were necessary I believe it would be more accurate to state that "No additional wells were installed...". Reilly's consultants stated that no additional wells were necessary but given some of the new information that has accumulated, this may be in error.
10. **Page 11, Table 2 and page 12, 2nd paragraph:** Please define "MSD".
11. **Page 12, 1st paragraph:** It is not clear if this comment refers to a future condition or a current situation. The 2nd sentence states that tar had originally been collected in 55-gallon drums. The next sentence changes tense and says these "could no longer be accepted". The last sentence states that tar and water are recovered in bulk by use of a 20 cubic yard vacuum box. However, my understanding is that the tar is still collected in 55-gallon drums. I am not sure what this sentence is stating.
12. **Page 16, 4th paragraph, last sentence:** This sentence reads "The *required* cap prevents exposure to these materials." I suggest rewriting it as "The landfill cap..." or simply "The cap...". "Required cap" sounds odd.
13. **Attachment B, Affidavit filed for Record with the County of Tuscarawas:** If this document is supposed to be the institutional controls required by the remedy, it appears to be inadequate. It does not restrict digging on the property or the installation of wells. Formal use restrictions should be placed on the property if there are none currently.